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UNIVERSITY OF ALBERTA

INDIVIDUALIZED INSTRUCTION AS A CLASSROOM MANAGEMENT TECHNIQUE IN INDUSTRIAL EDUCATION

BY

ALLEN J. DOW

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FUFILLMENT OF THE REQUIREMENTS FOR THE DEGREE
OF MASTER OF EDUCATION

IN

INDUSTRIAL ARTS EDUCATION
DEPARTMENT OF ADULT, CAREER AND TECHNOLOGY EDUCATION

EDMONTON, ALBERTA
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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled INDIVIDUALIZED INSTRUCTION AS A CLASSROOM MANAGEMENT TECHNIQUE IN INDUSTRIAL EDUCATION submitted by Allen J. Dow in partial fulfillment of the requirements for the degree of Master of Education in Industrial Education.

Dr. Clarence H. Preitz

Dr. Steven M. Hunka

Dr. Peter W. Wright

August 24, 1992

Abstract

In Alberta, junior high school industrial education is predominantly taught in a multiple activity learning environment. Classroom management of this unique learning environment is the major responsibility of, and challenge to an industrial education teacher. The major purpose of this descriptive study was to determine the role of individualized instruction in the classroom management of a multiple activity laboratory. Four supporting questions to the main purpose were: 1) does individualized instruction complement the classroom management methods used by teachers? 2) what were the problems encountered in individualizing instruction? 3) what were the types of instructional materials used by teachers to individualize instruction? and 4) how did teachers rate their use of different instructional materials available to individualize instruction?

A stratified random sample composed of 100 urban and 50 rural junior high school industrial education teachers in Alberta were selected to respond to statements of a two part instrument which were scored on a five point Likert scale. The response rate to the instrument was 71%.

The analysis and interpretation of data indicated that industrial education teachers attempted to manage multiple activity classrooms by manipulating space, time, students/personnel, content, and equipment/materials. Instructional materials used by industrial education teachers

vary. At one end of a continuum were non-print instructional materials which received little teacher preference. Composite instructional materials, (photographs/drawings with printed explanations/instructions) were preferred by half the teachers. The preferential choice of most teachers were printed text instructional materials which were augmented with verbal interpretation.

Participants indicated that teacher designed materials were more appropriate than commercially prepared instructional materials, that print instructional materials were preferred due to their versatility and low cost, and that commercially prepared materials were viewed as expensive, difficult to locate but did have student appeal. Participating teachers did use specifically identified instructional materials including; Pictorial Programmed Instruction texts, Learning Activity Packages, Articulated Instructional Development Booklets and videocassettes.

The findings of this study support the claim that individualized instruction can and does play a significant role in classroom management of an industrial education multiple activity laboratory.

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Appreciation is extended to all the teachers that participated in the study who took the time and made the effort to complete the instrument and thus provided the researcher with the needed data.

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CHAPTER I

THE PROBLEM

INTRODUCTION

Industrial Arts as a subject area in some form has been in Alberta schools since its territorial days when the subject area was termed manual training. This subject area has been dynamic in its evolution over the past quarter century. The most recent restructuring of the industrial arts curriculum and learning environment occurred during the decade of the 1960's. In 1963 the curriculum for industrial arts was revised and the organization of the learning environment for junior high school and senior high school industrial arts changed from a unit shop to a multiple activity laboratory.

According to the Junior High School Grades 7,8,9 Industrial Education Curriculum Guide (1982) an official publication of the Curriculum Branch of Alberta Education, the Alberta Multiple Activities Program is considered to be, "an organizational device through which a variety of technology based, exploratory experiences, can be presented in a minimum of space with a minimum of equipment" (p. 3). In further describing the curriculum structure of this program the Curriculum Guide states, "the junior high industrial education [industrial arts] program is divided into four fields of study which are further divided into

fifteen modules" (p. 3). The four fields of study include; Power Technology, Graphics Communications Technology, Materials Technology and Synthesizing. The four fields of study are taught in a learning environment that is organized as a multiple activity laboratory. A multiple activity laboratory is a room that has been equipped and organized so that unrelated activities of different materials and processes are organized and conducted concurrently under the direction of one teacher (Silvius & Curry, 1956).

In a multiple activity learning environment, learning activities are accomplished by the student through supervised hands-on participation and related theoretical information. Because of the number of activities to be taught and the number of students with varying abilities, the teacher in this laboratory is presented with a myriad of management problems.

To help teachers alleviate some of these management problems as they relate to instruction, the professional organization for industrial education teachers in Alberta, the Instructional Materials Committee (IMC) of the Industrial Education Specialist Council, Alberta Teachers' Association, have produced a series of print support materials that can be used by a teacher to individualize instruction. These instructional materials were referred to as Articulated Instructional Development Booklets (AID Booklets). How these instructional materials evolved will be discussed in a

subsequent section of this report. Some industrial education teachers in the province elected to design instructional materials that will meet the needs of their students.

A recent innovation used to individualize instruction at all levels of education has been the microcomputer and its user friendly programs. The computer has been used as a means of presenting instructional content to the learner through computer assisted instruction and computer managed learning. These procedures have significance in education because they are learner driven.

Although these instructional materials have been used for approximately twenty years to individualize instruction with students being taught industrial education in a multiple activity learning environment little research has been conducted to determine how these materials can be used to assist the teacher with management problems indigenous to a multiple activity laboratory.

Purpose of The Study

The purpose of this study was to determine how industrial education teachers in the province used individualized instruction as a classroom management technique when used in a learning environment organized as a multiple activity laboratory.

Supporting Objectives

In support of the major purpose of this study the

following supporting objectives were formulated:

To determine if individualized instruction complements the classroom management methods used by junior high school industrial education teachers, teaching in a multiple activity laboratory.

To determine the major problems that junior high school industrial education teachers encounter in their attempt to individualize instruction in their laboratory.

To identify the types of print based and non-print based instructional materials being used by junior high school industrial education teachers to individualize instruction.

To determine the perception that junior high school industrial education teachers in the province hold toward the use of print and non-print instructional materials to facilitate individualized instruction.

Need for the study

The Alberta Multiple Activity Program has been in existence since the early 1960's. Prior to this, the learning environment where industrial arts was taught was organized on a unit shop basis. The learning activities used by the teacher in that environment were taught by traditional methods. When the learning environment was reorganized as a multiple activity laboratory, new and often unique teaching methods had to be identified and/or developed. One of the major methods identified to organize instruction so that it could be individualized, was the use of teacher designed

instructional materials.

Although these instructional materials have been used by junior high school industrial education teachers for nearly three decades, little research has been conducted on the influence these instructional materials may have on classroom management. This void helped to establish a need for the study.

There have been studies conducted on the evolution/ history of the multiple activity program in Alberta (Smith, 1973, Morris, 1971). The research findings of these studies detail the historical development of this program. In their research , the researchers did not address how instruction could be individualized in a multiple activity laboratory to assist the teacher as an effective management technique.

Research results and articles addressing individualized instruction at the post-secondary level of industrial education is extensive. A need for this study was established when it was found that research directed at the individualization of industrial education in the secondary school, particularly the junior high school level, was not as prevalent.

The problem to effectively implement, manage, and teach a number of learning activities simultaneously to a class of junior high school students enroled in a multiple activity industrial education program, can cause confusion and oft times frustration among teachers. These teachers are often

placed in a multiple activity laboratory with no prior preparation on how to individualize instruction or how to teach in that type of learning environment. Research needs to be conducted that will assist these teachers in adapting to teaching in a multiple activity laboratory. The results of this study should help to satisfy that need.

Significance of the Study

Results of this study should have significance to educators who are responsible for the preparation of non-vocational industrial education teachers who will be teaching the Alberta Multiple Activity Program in the secondary schools of the province. These results should provide information that will assist future teachers with the implementation of classroom management procedures.

The study may have significance for other researchers who may wish to conduct experimental studies to determine if there is a correlation between individualized instruction and other management procedures used for class control.

There is a recent trend by some school superintendents in Alberta to fill available industrial education teaching positions in their districts with teachers who have no formal university preparation to teach in a multiple activity learning environment. Often these teachers are selected from the general teaching population of the district and aspire to teach industrial education for a variety of personal and

professional reasons. Many of these teachers may not be aware of the difficulties associated with the problems that are related with the teaching/management of industrial education to junior high school students. The results of this study may be especially beneficial to these teachers.

Participants in this study, may become cognizant through their involvement in the research of potential solutions to problems in classroom management that they may have in their laboratories.

This study may provide information that will assist administrators, and those in management and leadership roles in understanding the problems that industrial education teachers are confronted with as they teach in a multiple activity laboratory.

Limitations

This descriptive study had the following limitations:

The study was limited to those industrial education teachers from both rural and urban school jurisdictions, who have responsibility for teaching non-vocational industrial education to learners at the junior high school level and who were selected to be involved in the study.

There were a number of factors related to the research instrument that place limitations on the investigation. Among these were: (1) The design of the research instrument and the wording of the statements that comprise the instrument; (2) the accuracy of response by participants to

statements on the instrument; and (3) the number of participants who returned the completed instrument for analysis.

Another limitation was the fact that this study is both Alberta and subject area specific and the results of the research can not be generalized to other provinces or to other subject areas taught in the secondary schools of the province.

Definition of Terms

Definitions selected for use in this study were taken from content experts who have written on individualization of instruction and classroom management procedures for industrial education. These definitions are study specific and are presented for the benefit of the reader.

Classroom Management

Reference is made to classroom management in industrial and vocational education learning environments by authors such as Finch and Cronkilton (1989), Silvius and Bohn (1976), Silvius and Curry (1956) who have written curriculum and instruction textbooks for university students. It is rather unfortunate that these writers do not provide a definition for the term classroom management although one could be inferred from what was written. Other authors describe classroom management or components of it within a regular classroom setting. These definitions can be applied to a

classroom environment organized as a multiple activity laboratory. Lemlech (1979) believes there is a correlation between teacher accountability and classroom management. To this author classroom management is "the orchestration of classroom life: planning curriculum, organizing procedures and resources, arranging the environment to maximize efficiency, monitoring student progress, anticipating potential problems" (p. 5).

Calderhead (1984), writing on the major teaching tasks faced by a teacher, would subscribe to the definition for classroom management that Lemlech presented. According to Calderhead classroom management includes "the organization of pupils and materials, the establishment of classroom procedures to facilitate the work of the class and dealing with distractions and threats to classroom order" (p. 21).

The National Society for the Study of Education dedicated its' 1978 yearbook to Classroom Management. In this volume, Duke (1978) broadly defined classroom management when he wrote: "classroom management constitutes the provisions and procedures necessary to establish and maintain an environment in which instruction and learning can occur" (p. xii). Duke (1982) also wrote "the critical element of a teacher's role thus shifts from control to management - management of time, space, materials, auxiliary personnel, and students" (p. vii).

Johnson and Brooks (1979) in describing classroom

management categorized the managerial tasks applicable to regular classroom teachers as: "(a) planning (programming, decision making); (b) organizing; (c) coordinating (administering); (d) directing (commanding); (e) controlling (reappraising, monitoring); and (f) communicating (reporting)" (p. 32). In addition an industrial education teacher also "(a) budgets; (b) programs; (c) monitors; and (d) reappraises", in their duties as classroom managers (p. 32).

Classroom management can be further defined by listing some of the goals of management. Evertson and Emmer (1982) list the goals of management as: a) "establishing a climate for learning" where the teacher is "to promote the development of high levels of engagement in academic tasks and to prevent widespread disruptive or other off-task behaviours", b) "engage students in school work and to keep them engaged", c) "organize instruction and activities for large groups of children" (p. 3-4). Evertson and Emmer (1982) also wrote "the teacher's goals must embrace both custody and socialization of children, as well as learning and evaluation concerns" (p. 3).

The definition given by Lemlech for classroom management was accepted for this study.

Individualized Instruction

There are as many definitions for the term "individualized instruction" as there are writers who have

written on this subject. Rather than clarifying the issue, with their definitions they have tended to add confusion when it comes to locating an acceptable definition for this term.

According to Southworth (1971), "individualized instruction consists of planning and conducting with each pupil, programs of study and day-to-day lessons that are tailor made to suit his learning requirements and his characteristics as a learner" (p. 249). Jeter (1980) in Approaches To Individualized Instruction gave support to the position of Southworth but also presents some alternatives that the student may take to acquire mastery of the material to be learned. Jeter's belief was there is no precise definition for the term "individualized instruction". In support of that position Jeter (1980) wrote the following:

> "individualized instruction" has no precise meaning. It may mean that students are free to progress at their own rate, but that all students are exposed to the same sequence of materials and the same instructional methods. Or it may mean that students are allowed to pursue some instructional objectives unique to their own interests and abilities. In still other cases, students go through the same curriculum at their own pace, but are allowed to choose among many activities and to demonstrate mastery in different ways. (p. 1)

The definition accepted for this study is the one presented by Southworth because it implies the linking together of a number of interrelated components to form an instructional delivery system that is goal orientated to assist the learner to achieve those goals which can be both purposeful and motivational (Preitz, 1973, p. 10).

Industrial Education

A term that has caused much confusion among lay people and educators specifically in the province is "industrial education". This term is defined by various authors who have written on either the theory of vocational education or methods to organize and deliver instructional content for industrial arts and vocational education. Among the authors who provide a definition for industrial education are Giachino and Gallington (1977), Baird (1972), Silvius and Curry (1971), Roberts (1965), and Silvius and Bohn (1961).

In an attempt to reduce this confusion among stake holder groups in the province concerned with industrial education, personnel of Alberta Education prepared the Industrial Education Manual For Guidance To Teachers, Counsellors and Administrators (1983). When preparing this manual these personnel wrote a definition for industrial education that is applicable to Alberta. In the manual, can be found this definition for the term industrial education:

> a program consisting of courses that provide a continuum of experiences, starting with exploratory experiences and activities in the elementary and junior high school, expanding in the high school to the development of skills in career fields, and culminating in on-the-job experience. Industrial Education at the junior high school, the exploratory phase of the continuum, provides the opportunity for the students to explore, reason, experiment and discover the reality of the technological society in which we live. The content of the program deals with industry, its organization, materials, processes, products, occupations, and the problems resulting from the impact of technology on society. (p. 2)

The paradigm in the manual which accompanies this definition illustrates the phases a student progresses through in making a career choice. That progression is from familiarization to occupational choice.

Multiple Activity Laboratory

Silvius and Curry (1971) in Managing Multiple Activities in Industrial Education define a multiple activity laboratory as "a school industrial laboratory designed and equipped to offer instruction in a variety of industrial or technical areas for breadth or depth purposes in industrial education" (p. 594). Smith (1973) supports the comprehensive definition for a multiple activity laboratory given by Silvius and Curry, but is more specific in defining the term when he states "it [a multiple activity laboratory] is a laboratory where three or more activities are in progress at the same time" (p. 109). Alberta Education in its curriculum publication Junior High School Grades 7-8-9 Industrial Education Curriculum Guide (1982) (rather than defining a multiple activity laboratory) describes the organization of this learning environment:

> into a number of different areas representing components of the fields of study . . . . Each area within a laboratory is self-contained as possible with provisions for the storage of tools, projects and stock within it. The class is divided into three or more groups with each group working through the course content in the assigned area. (p. 3)

This description provided by Alberta Education for the term

"multiple activity laboratory" with the supporting definition given by Smith will be used throughout this report. Combining these two definitions for the term multiple activity laboratory the revised definition reads:

> A multiple activity laboratory is the learning environment for industrial education where three or more activities are taught concurrently in a number of different areas representing components of the four fields of study. Each area within the laboratory is self contained as possible with provisions for the storage of tools, projects, and stock within it.

Organization of the Thesis

The following organizational pattern will be used for this thesis.

Chapter Two	Review of Literature and Related Research
Chapter Three	Methodology and Analysis of Data
Chapter Four	Interpretation of Data
Chapter Five	Summary, Conclusions, Recommendations and Observations

CHAPTER II

REVIEW OF RELATED LITERATURE AND RESEARCH

Introduction

Chapter I of this study described the research problem, its supporting objectives, the need for the study, its significance and operational definitions.

The content of this chapter will review related literature and research that has been completed on the topic being investigated. The chapter is organized under these headings: an overview of individualized instruction; selected definitions for the term individualized instruction; a description of methods used to individualize instruction; a description of the Alberta Multiple Activity Program, a description of classroom management; and research completed that is related to the present study.

An Overview of Individualized Instruction

The concept of individualized instruction has been traced by Blake and McPherson (1969) to the teachings of Confucius, Aristotle, Plato and Socrates all of whom recognized the existence of human differences and variables in the educational process (p. 7). Charlemagne, in the middle ages, recognized the individual teacher who paid attention to individual differences in the teaching method. During the renaissance in Italy and the reformation in England, students with natural ability were urged to proceed

at their own rate. Rousseau strongly influenced education in the eighteenth century when he criticized teachers for giving the same educational material and process to all students, thus stifling individual creativity. In the twentieth century, Alfred Binet's "I.Q." test greatly influenced education as he believed that the aptitude of children determined what they learned. In the same time period Maria Montessori introduced her beliefs in student self paced instruction and in concentrating on what interested the learner (Blake & McPherson, 1969, pp. 7-8).

Blake and McPherson (1969) believe that early attempts at education in America were based on the tenets of the individualized design of instruction; this was primarily due to the low enrollments in one room school houses. In these schools, there was a cross section of students of all ages and abilities which led the teacher to utilize techniques that were equal to today's definitions of individualization of instruction. However, as class enrollments increased, school administrators began to offer education in grade-level groups. This grouping provided a means for teacher control of students, and thus individualized instruction began to have less emphasis. As a consequence, "American schools from this point on became predominately "textbook schools" (Blake & McPherson, 1969, p. 9).

Educators in both the United States and Canada, up until the last half of the twentieth century, used the traditional

teaching/learning system of lock-step. This approach grouped 30 - 40 students in a class and provided for the fixed entry of students who were provided with fixed content to be learned within a fixed period of time.

Between 1910 and 1920, there were a small cadre of American educators who attempted to find an alternate method of program delivery that would vary the time component of the learning cycle. This system of instructional delivery was labelled individualized instruction. This method of delivering instructional content continued to gain momentum ever since the Dalton and Winnetka Plans emerged in the United States.

Three individuals who were responsible for leading the thrust toward individualized instruction in America in the early decades of the twentieth century were: Dr. Frederick Burke, a post secondary instructor at the San Francisco Normal School; Helen Parkhurst, credited with developing the Dalton Plan; and Carleton W. Washburne, developer of the Winnetka Plan.

The Dalton Plan

Credit for the Dalton Plan is attributed to Helen Parkhurst who implemented the plan into the Dalton School District in Massachusetts. Early in her teaching career, Parkhurst, taught in a one room school where she encountered forty rural students who were divided into eight grades or classes. In Education on the Dalton Plan, Parkhurst (1926)

described how she coped with that situation when she wrote:

> I had thus to provide occupation for seven classes while I gave oral instruction to one class. To get every pupil busy on something until I could overlook his work occurred to me to be the best solution to the difficulty. (p. 8)

Parkhurst referred to this method of teaching as the Laboratory Plan. Later she used this approach to teach crippled children and then adapted it with normal children.

The first principle of the Dalton Plan was "freedom", which was to permit the student the privilege of working on a task uninterrupted until the task was completed. In describing the principle of "freedom", Parkhurst (1926) stated:

> The pupil must be made free to continue without interruption his work upon any subject in which he is absorbed, because when interested he is mentally keener, more alert, and more capable of mastering any difficulty that may arise. (p. 16)

Under the Dalton Plan there were no bells in the school to force class changes or to interrupt the students' concentration. Students were encouraged to work at their own pace in order to absorb knowledge thoroughly.

The second principle of the Dalton Plan "was co-operation", which Parkhurst preferred to call "the interaction of group life". The design of the Dalton Plan helped to force students to involuntarily react with individual peers, groups or teachers thus avoiding isolation to help promote the development of socialization skills (Parkhurst, 1926, p. 17).

Students involved in the Dalton Plan were presented with a yearly outline, which was described by Parkhurst (1926) in this way:

> This will give him a perspective of the plan of his education. He will thus be able to judge the steps he must take each month and each week so that he may cover the whole road instead of going blindly forward with no idea either of the road or the goal. . . . What does a pupil do when given . . . responsibility for the performance of such and such work? Instinctively he seeks the best way of achieving it. Then having decided, he proceeds to act upon that decision. Supposing his plan does not seem to fit his purpose, he discards it and tries another. Later on he may find it profitable to consult his fellow students engaged in a similar task. Discussion helps to clarify his ideas and also his plan of procedure. When he comes to the end the finished achievement takes on all the splendor of success. It embodies all he has thought and felt and lived during the time it has taken to complete. This is real experience. It is culture acquired through individual development and through collective co-operation. It is no longer school - it is life. (p. 19)

From the yearly outline, monthly amounts of work (contracts), were parcelled out by the teacher to the students. Since there was no school timetable to be followed, each student worked individually with the teacher to establish a daily routine of studies. This routine acted as a guide that the student was to follow. Students were assigned to classrooms. Programs for these students were developed and were based on the subject specialty of the teacher. The role of the teacher was to act as a facilitator for the students and provide assistance whenever it was needed.

Student movement was less controlled than in the traditional classroom. Students were permitted to move about

the classroom to use the library, the community, and other locations while small groups of students could cluster to study a common topic.

Student progress was displayed through the use of graphic tables for both student and teacher use. Using this technique teachers were able to: a) determine what each student was working on, and b) monitor the student who had a tendency to move ahead in their strong subjects while avoiding their weaker subjects.

Since its inception in 1921 the Dalton Plan has received recognition and praise from both teachers and students. The Dalton Plan, along with the Winnetka Plan established the foundation for the individualized instruction movement that was to appear later in American education in the twentieth century.

The Winnetka Plan

The Winnetka Plan was misnamed. The Winnetka Plan, founded by John Smith, had its roots in the convergence of three forces that occurred between 1912 and 1919 in Winnetka, Illinois.

The first of these forces was a small group of prosperous business and professional men who lived in Winnetka (Illinois) but worked in Chicago. This group of men had received their education in private schools. This intellectual group had the desire to make the public schools of Winnetka so effective, that they would be proud to have

their children attend these schools in lieu of creating a private school for their children to attend. Members of this closely knit group ran for election as members of the school board. They were successful and won positions on the local school board which enabled them to establish their dream school (Washburne, 1963, p. 4).

Between 1912 and 1919 this small school system experienced growing pains which included several superintendents who did not meet the expectations of the school board. Consequently, the school board was continually searching for an exceptional educational leader who could match the ideals that the board established.

The second major factor occurred by chance when, after graduating from Stanford University in 1912, Carleton W. Washburne accepted a teacher-principalship in a rural school in California. Although Washburne was not properly trained in the pedagogy of teaching, he inadvertently discovered the procedures used to personalize education. Students in this one room rural school were grouped at first in lock-step fashion as a large group. Washburne soon learned that he was faced with a dilemma because he was trying to teach a large group of students who were of different ages and possessed a wide variety of abilities.

Washburne soon realized that the best way to teach these students was to provide them with lessons on an individual basis, a concept he retained throughout his professional

career in education. Washburne's second year of teaching was in another school district, where he worked with a group of "special students" as a pilot project. This special group consisted of seventeen students who were slow learners, physically handicapped, mentally retarded, and some who had behavioral problems. These students ranged from eight to fifteen years of age. Washburne had the challenge of raising these students' knowledge to acceptable levels for integration into regular classes within one year.

During his second year of teaching, Washburne read Burke's monograph, Remedy for Lock-Step Schooling. After reading that publication, Washburne generated enough interest to contact Burke who taught at the San Francisco State Normal School. At that time, teacher preparation consisted of two years of normal school for high school graduates. From experiments conducted at the normal school by Mary Ward, the first formalized steps were taken to identify differences in children's learning levels and abilities. When the research findings were brought to the attention of Burke, his enthusiasm for this type of instruction became the driving force toward the preliminary development of individualized education in America.

Burke and Ward developed, "Self Instruction Bulletins" for use with their classes as instruction modes at the normal school (Washburne, 1963, p. 8). Washburne (1963) in Winnetka wrote, "from that point on, instruction in the

elementary school attached to the normal school was on an individual basis, each child proceeding at his own rate, neither retarded by slower children nor hurried by faster ones" (p. 9).

In the summer of 1914, Washburne was hired by Burke to organize and conduct the work in elementary science at the San Francisco State Normal School. Washburne was influenced by Burke for a period of five years, during which they developed techniques for individualizing programs.

At this time a member of the Winnetka school board read a paper by Burke and contacted him, asking him to recommend an innovative person to become the superintendent of the Winnetka School Program. Burke recommended Washburne who, in 1919, was appointed superintendent of the Winnetka Public Schools. This marked the genesis of the Winnetka Plan.

In describing the Winnetka Plan, Washburne preferred to use the term "spirit". It was because of Washburne's beliefs, enthusiasm, magnetism, and domineering presence that the Winnetka Plan achieved the stature it did in education. Under the tutelage of Washburne, staff of the Winnetka schools developed the Winnetka educational system where " research was done, self-instruction text books were written and revised, diagnostic tests were devised, and a philosophy emerged" (Washburne, 1963, p. 20). It took some time before the original teachers were convinced and agreed with Burke's maxim, "a years work in a subject is what the slowest, normal

diligent child can accomplish in a year" (Washburne, 1963, p. 23). It can be inferred from this statement that Washburne meant that the expected amount of work completed by a student in a school year should be at a level that would allow the slowest students the opportunity to complete the required work but, at the same time, provide enrichment opportunities for the higher achiever. Under the tenents of the Winnetka Plan it was assumed that every student could learn every concept; it just took some students longer than other students to learn these concepts.

The original staff at the Winnetka schools were specially selected, they were dedicated, enthusiastic, and committed to the beliefs of individualized instruction directed under the leadership of Washburne. It is evident from what Washburne wrote that he makes little comment on either the difficulties or the problems that were encountered with the Plan. The approach described by Washburne in Winnetka, which was co-authored with Marland, has a bias toward the Winnetka Plan. This was due to Washburne's very strong dynamic leadership and beliefs on individualization of instruction. For twenty-four years, from 1919 to 1943, the Winnetka Plan was a prime example of an innovative teaching system: that of individualized instruction, as a school managing system for other American schools to emulate. However, it was difficult for replacement superintendents and staff to maintain. As a consequence when the original staff

retired or moved to other positions, the demise of the Winnetka Plan became imminent.

Individualization of instruction in the United States, following the demise of the Dalton and Winnetka Plans, lay dormant until 1963, when Skinner reported the research findings on operant conditioning and programmed instruction. Robert Mager in the 1960's, contributed to the individualization concept by advocating that educators develop performance objectives for students to attain following instruction.

The accountability movement in American education also influenced the individualization of instruction concept. Several prominent plans to individualize instruction originated in various parts of the United States. Among these were: Program for Learning in Accordance with Need (PLAN), Individually Guided Education (IGE), and Individually Prescribed Instruction (IPI).

PLAN was developed jointly by public school teachers from states of the Eastern United States and California and professional personnel of the Westinghouse Learning Corporation. PLAN was developed to satisfy several needs uncovered by Project Talent. The results of Project Talent revealed: a great variation in the levels of achievement of students of the same age group in classes across the United States; an indication of lack of student interest in, and questionable need for, some required courses; an increasing

trend for students to complete High School; and there was an increase in expansion of the available knowledge (Flannagan, et al., 1975, pp. 137-138).

The individualized system central to PLAN was the Teaching-Learning-Unit (TLU), "which includes instructional objectives associated with recommended learning activities and criterion tests" (Flannagan, Shanner, Brudner, & Marker, 1975, p. 136). A bank of TLU's were complemented by a strong guidance system to form an individualized Program of Studies (POS) for each student. Record keeping was extensive and was accomplished by use of a computer (Flannagan et al., 1975, pp. 136-167).

This plan was field tested by fourteen participating school systems across the United States. From the results of the pilot tests Westinghouse conducted evaluations, made revisions and commercially marketed the PLAN to school systems. Flannagan, et al., (1975) place the responsibility for learning on the learner in the PLAN system:

> For this type of educational program to be functional, the individual student must take the responsibility for formulating goals, making decisions and plans with respect to his educational development, and managing the learning program required to achieve the goals he has set. (p. 138)

A second major individualized instruction system was Individually Guided Education (IGE) developed by the Wisconsin Research and Development Centre for Cognitive Learning. Under this system the learner is provided

individual instruction which is behaviour referenced. Specific selected student behaviour objectives were established jointly by instructional staff and students as these objectives related to the student's personal characteristics and school programs. Klausmeirer (1975), in describing the instructional programming model of IGE wrote:

> At the heart of IGE is the instructional programming model for the individual student (IPM). . . . It specifically takes into account each pupil's beginning level of performance, rate of progress, style of learning, motivational level and other characteristics in the context of the educational program of the building. (p. 55)

IGE students work collaboratively in both small and large groups and received help on a one to one basis from teachers, aides, and peers.

According to Charles (1980), the following provisions must be taken into consideration by a school who may want to implement IGE: "entering behaviour assessment; objectives; curriculum content and sequence scope; instructional materials; instructional staff; instructional procedures; continual assessment; and school facility requirements" (p. 12).

Individually Prescribed Instruction (IPI) was developed by the Learning Research and Development Centre of the University of Pittsburgh. School systems in the service area of the University were clamoring for a flexible classroom organization rather than the traditional classroom with its fixed time table and fixed content. As a result, IPI was

developed in the early 1960's for elementary schools (K-6) located in the Pittsburgh area.

In describing the features of IPI, Scanlon (1973) stated, "a basic aspect of IPI is a rather detailed provision for diagnosis of pupil skills and abilities and continuous monitoring of pupil progress" (p. 109). With IPI considerable effort is placed on evaluation of student abilities, which are comprehensively recorded and maintained as the student progressed through the program. In IPI, "various combinations of instructional materials, testing procedures, and teacher practices are used to accommodate individual student differences" (Jeter, 1980, p. 27). "The IPI system curriculum is non grade set but rather each subject area is divided into levels, each subject level containing a specified number of behavioral objectives" (Charles, 1980 p. 213). A second feature of IPI, was that of the individual student's curriculum program. This program was guided by a written prescription, which was prepared by the teacher and student, identifying the student's individual needs and interests.

Duties of the teacher under the IPI system closely parallel those of any individualized program and as Jeter (1980) said, the teacher "spends much of his/her time in administering tests, diagnosing learning needs, writing learning prescriptions, analyzing student progress, providing individual guidance to students" (p. 28). With the bulk of

the teacher's time devoted to individual work, the teacher seldom lectures, presents to large groups, etc: rather he/she instructs in small groups.

Other prominent educational psychologists who contributed many insights to the field of education, were: S. L. Pressey -teaching machines; B.F. Skinner - conditioned learning research; and R. F. Mager - performance objectives. A description of individualized instruction would be incomplete without discussing the contributions that each of these individuals made.

Education has ties with psychology and scientific research if education is to be effective. Innovative teaching strategies are supported by the research through scientific experiments primarily conducted and reported by B.F. Skinner, a learning psychologist, in the early 1950's. Skinner's first experimental subjects were small animals like rats and pigeons; only later did he adapt his research to larger animals and eventually to the human species. A main thrust of Skinner's research resulted in conditioned learning, which is based on the principle of positive reinforcement immediately after subject performance of a specified task. Operant conditioning in the experimental laboratory can best be described as "reward and punishment" (Skinner, 1968, pp. 61-62). The adaptation of operant learning to education was described by Skinner (1968) when he wrote:

> Teaching is the arrangement of contingencies of reinforcement under which students learn. They learn without teaching in the natural environments, but teachers arrange special contingencies which expedite learning, hastening the appearance of behaviour which would otherwise be acquired slowly or making sure the appearance of behaviour which might otherwise never occur. (pp. 64-65)

Skinner strongly advocated the provision of immediate feedback and reinforcement of how well the learner is doing for effective teaching/learning to occur.

Equipment is an important feature when conducting experimental research with animals, and Skinner thought that equipment could have a role in teaching humans, thus the advent of teaching machines. Skinner (1968) defined a teaching machine as, "any device which arranges contingencies of reinforcement" (p. 65). Teaching machines assist the teacher in presenting course content to the students while providing immediate reinforcement. Skinner (1968), in The Technology of Teaching, acknowledged Pressey (1920's) by writing, "Pressey seems to have been the first to emphasize the importance of immediate feedback in education and to propose a system in which each student could move at his own pace" (p. 32). Pressey proposed an extensive use of teaching machines to complement the teacher in performing his daily teaching duties and allowing the student to progress at individual rates. With the increased use of teaching machines Skinner thought that the role of the teacher would change (p. 55). The teacher would be free to teach rather

than be tied down with the mundane tasks of correcting papers, recording marks, etc. Skinner (1968) was a proponent of teaching machines and innovative schools (possibly those using individualized instruction) because he stated, "Students may continue to be grouped in "grades" or "classes", but it will be possible for each to proceed at his own level, advancing as rapidly as he can" (pp. 55-56).

Today a teaching machine is just a mechanical and electrical device requiring programming to make it functional. Programming is a mental and physical process where a list of sequential acts are thoroughly thought out, placed on electrical circuits or communicated to humans and equipment, to cause a desired performance. In teaching this process is called programmed instruction. "Programmed instruction also made its first appearance in the laboratory in the form of programmed contingencies of reinforcement" (Skinner, 1968, p. 65). Skinner's early rat experiments called for the rat to follow a set of predetermined actions before it was rewarded with food. These predetermined actions were the grass roots of the programmed instruction movement which became part of the delivery system to individualize instruction.

Educators program instruction to guide the student's learning processes by directing student behaviour toward a specified goal. The programming of instruction creates the possibility of student groups splitting to become more

individualized. Programming instruction is impossible without goal setting or objectives being formulated by the programmer. Robert Mager, a noted author in the field of objective formulation, advocates writing of performance objectives in setting goals for students. The duty of the teacher according to Mager (1962), is to

> first decide upon the goals he intends to reach at the end of the course or program. He must then select procedures, content, and methods which are relevant to the objectives, cause the student to interact with appropriate subject matter in accordance with the principles of learning, and finally measure or evaluate the students's performance according to the objectives or goals originally selected. (p. 1)

Before a teacher can systematically sequentialize a list of activities or procedures in a laboratory process the teacher must know what he/she wishes the student to accomplish, do, or demonstrate at the end of the process. To sequentialize instruction systematically, the programmer-teacher must, "first analyze the problem, decide exactly what result he wants to obtain, selects and applies the tool most suitable to getting the desired result, and then checks to see that the result has actually been obtained" (Mager & Beach, 1967, p. 1).

What is Individualized Instruction?

Defining a concept is difficult and to define an educational concept such as "individualized instruction", and have complete agreement among writers and educators, is a near impossibility. Literature related to individualized

instruction is abundant and there are as many definitions for the term "individualized instruction" as there are authors who have written on this topic. Most notable among these authors are: Jeter (1980), Charles (1980), Preitz (1973), Dunn and Dunn (1972), Veatch (1972), Southworth (1971) and, Blake and McPherson (1969).

A statement by Jeter on the topic of individualizing instruction (1980) includes,

> "individualized instruction" has no precise meaning. It may mean that students are free to progress at their own rate, but that all students are exposed to the same sequence of materials and the same instructional methods. Or it may mean that students are allowed to pursue some instructional objectives unique to their own interests and abilities. In still other cases, students go through the same curriculum at their own pace, but are allowed to choose among many activities and to demonstrate mastery in different ways. (p. 1)

Dunn and Dunn (1972) preferred some variances that should be given serious consideration by those who contemplate implementing an instructional delivery system to individualize instruction. Included in these variances are:

> Individualization or personal instruction simply focuses the emphasis of the instructional process on each individual student - his skills, abilities, interests, learning styles, motivation, goals, rate of learning, self-discipline, problem solving ability, degree of retention, participation, strengths, weaknesses and prognosis for moving ahead in various curriculum areas and projects. (p. 31)

Despite the various definitions, individualization of instruction is not a teaching method, it is a method of content delivery, the way of managing the classroom, and

according to J. Veatch (1972), individualized instruction is, "the way a teacher arranges children, equipment and materials so that each child can learn, . . . without undue stress and strain" (p. 90). Preitz (1973), not only gave support to what Veatch wrote but took the position that individualization of instruction helps to establish an educational climate when he said:

> It is the way that the educational climate is established, the way the equipment and materials are organized and the way the instructional strategies are planned so that each student learns certain educational outcomes to a specific criterion of performance. (p. 89)

A definition by Southworth (1971) states, "individualized instruction consists of planning and conducting with each pupil, programs of study and day-to-day lessons that are tailor-made to suit his learning requirements and his characteristics as a learner" (p. 249).

Blake and McPherson (1969) in Individualized Instruction - Where Are We wrote, "individualized instruction means that the learning program for each curriculum area is organized in such a manner as to allow each child to move at his own pace under the guidance of his teacher" (p. 49). The learning environment, when individualized instruction takes place, is structured where the teacher allows the student to work alone, more so than in the traditional classroom. The teacher as a facilitator of learning is not replaced with a teaching machine, nor is the student left entirely on their own. In this teaching/learning environment the teacher

constantly evaluates, plans the learning activities and is available to meet with either the individual student or small groups of students as the need may be.

When the decision was made to accept the multiple activity laboratory as the learning environment for industrial arts it became evident that other methods of delivering instructional content would have to be used. Many teachers elected to individualize instruction because of the variety of print and non-print instructional materials that would be used as devices to help manage the laboratory.

Multiple Activity Development in Alberta Industrial Education

Alberta's practical subject could be placed on a continuum of time from manual training, which was the predominant form of practical education in the early 1900's, to industrial education in the 1980's and 1990's. Along this continuum of time were major events which occurred to provide momentum to the evolution of practical education in the province.

Manual training throughout Canada became predominant because of the experiment that was supported in 1900 by Sir William MacDonald. MacDonald was a wealthy tobacco merchant, who agreed to provide financial support of 1.5 million dollars to establish twenty one centers for manual training across Canada for a period of three years, 1900 - 1903. The purpose of these centers was to provide manual training

programs. Financial support under the plan covered: proper facilities, equipment, and salaries for teachers imported from Great Britain, Sweden and the United States to train local teachers to become specialists in manual training. Alberta received one centre under the MacDonald experiment which was located at Nose Creek outside of Calgary.

The transition from manual training to manual arts occurred gradually as educators dispensed with rote skill exercises and adopted more useful artistic products as a method of presenting instructional content. At the end of World War II, 1945, industrial arts as a practical subject replaced manual arts in Alberta. This subject area continued to experience mediocre growth and development until 1960. In the early 1960's two major events occurred which greatly influenced the direction that industrial arts would take in Alberta. These events were: the enactment of the Technical and Vocational Training Assistance Act (T.V.T.A.) by federal legislators and the arrival of H. R. Ziel to the Edmonton campus at the University of Alberta.

From 1945 until the arrival of Ziel in 1960 most industrial arts courses in the secondary schools of the province were taught in either a unit shop or in a general shop setting where skills in woodwork, metalwork and drafting were the predominant learning activities. Immediately following the Second World War, educators in the province stressed skill acquisition by students to fill the demand of

industry for skilled tradesmen. The focus on skill development was suited to student needs in 1945 but by 1960 dissention was on the increase among provincial educators about the purpose and function of industrial arts which had become quasi-vocational education. Among these critics of industrial arts were certain members of both the Edmonton and Calgary Public School Boards who advocated that the Department of Education drop these courses because of their expense (Mathew, 1984, p. 91). This growing force of dissention caused educational leaders in the province to initiate a philosophical shift for the purpose of industrial arts, which had been considered by both laymen and professional educators as quasi-vocational education.

When the Federal Government enacted the T.V.T.A. in 1960, the seed was sewn for vocational education and industrial arts to diverge in their purposes and grow independent of each other. The T.V.T.A. was cost shared legislation for secondary and post-secondary school vocational education through agreement between the Federal and Provincial Governments. The T.V.T.A. "provided financial assistance to the provinces for the development of vocational education programs and facilities for producing skilled manpower" (Roskewich, 1990, p. 32). The T.V.T.A. and its accompanying agreement initially was composed of nine cost sharing programs later expanded to ten, of which Program 1, Vocational High School Training Program, and Program 7,

Training of Technical and Vocational Teachers, have significance to this study.

Control of education, including financing, was bestowed upon the Provincial Governments by the British North America Act (1867). The Federal Government maintains a hold on education through vocational education because of the close relationship of vocational education to manpower and career development which called for federal assistance. Under the terms of the T.V.T.A., this assistance came in the form of funds to support vocational education only and no funds were provided for the support of industrial arts. The availability of a large sum of federal money assisted in persuading Alberta's educational leaders to rethink their philosophical position toward industrial arts and vocational education.

Prior to the passage of the T.V.T.A., the functions of vocational education and industrial arts at the secondary school level were complementary , to the point that they were almost indistinguishable. Following 1960, a schism occurred between vocational education and industrial arts when their purposes were clarified and sources of funding and support favoured vocational education. Industrial arts was relegated to a second class stature, although both subject areas maintained parallel growth patterns.

Program 1 of the T.V.T.A. of 1960, provided assistance to participating provinces to establish a secondary school

Vocational Education Program. Indirectly industrial arts in Alberta was affected by Program 1 of the T.V.T.A.. Vocational education in some instances is dependent upon industrial arts as a feeder because the latter provides students with a broad but limited knowledge base to assist them in making a wise career choice. As a result, industrial arts received increased attention from school board administrators as well as monies derived from within the system to support the new role of industrial arts. The increased financial support given to industrial arts spurred an increase in program growth and course expansion. Proposed radical changes by educators to the organization of industrial arts and method of teaching can, therefore, be indirectly attributed to Program 1 of the T.V.T.A.

Program 7 is significant to this study because under this program the Division of Industrial and Vocational Education, now (1991) the Department of Adult, Career, and Technology Education, was established in the Faculty of Education of the University of Alberta. The initial mandate of this Division was to prepare prospective vocational education teachers and was later expanded to include the preparation of industrial arts teachers. Prior to the passage of the T.V.T.A., teacher preparation in industrial arts was conducted at the University of Alberta at either the Calgary campus or the Edmonton campus. At the Calgary campus preservice skill development courses were taught by

instructors using unit shop facilities of the Provincial Institute of Technology and Art, later to be named the Southern Alberta Institute of Technology. Psychomotor skill development courses were taught doing the first two years of the four year program with supplementary pedagogical courses taught by professors on the Calgary Campus. The last two years of this program were offered at the Edmonton campus. In the early 1960's when the industrial arts teacher education program was being phased out at the Calgary Campus, it was transferred to the Edmonton campus.

University administrators appointed Dr. H. R. Ziel to chair the newly formed Division of Industrial and Vocational Education. Later this Division was granted Departmental status when other Divisions in the Faculty of Education were granted similar status. Ziel came to the University of Alberta from the eastern United States where he obtained a Master's degree from Cornell University and a doctorate from Wayne State University in Michigan (Smith, 1973, p. 81). This industrial education teacher educator arrived in Alberta at the opportune time for initiating change. Although resources had been pledged the mechanism to initiate change for industrial arts was lacking. Dr. Ziel provided the leadership to establish the Alberta Plan for industrial arts to be taught in a multiple activity learning environment.

The multiple activity concept was a radical concept when compared to the unit shop which was used in Alberta to

organize industrial arts facilities. There were, however, 80 industrial arts facilities in the province that were recognized as General Shops - which have a similar organizational pattern for the learning environment as a multiple activity laboratory. The title given to the Industrial Arts Teacher Education program at the University of Alberta was referred to as the Alberta Plan. When the concept of the multiple activity laboratory was accepted by personnel of the Department of Education it was renamed the Alberta Multiple Activity Program. This difference in terminology caused semantic confusion among both lay people and professional educators of the province.

One of Ziel's major innovations was the adoption of the multiple activity laboratory to replace both the unit and general shop as the way to organize the learning environment for industrial arts at the secondary school level, as well as, at the teacher preparation level. This helped to provide articulation between the university teacher preparation program and the secondary school program.

Personnel of Alberta Education, Curriculum Branch, consider a multiple activity laboratory to be,

> an organizational device through which a variety of technology-based, exploratory experiences, can be presented in a minimum of space with a minimum of equipment. The laboratory is organized into a number of different areas representing components of the field of study. . . . Each area within a laboratory is self contained as possible with provisions made for storage of tools, products and stock within it. (Industrial Education Curriculum Guide, Junior High School Grades 7-8-9, 1983, p. 3)

The program that Ziel put in place consisted of four interrelated phases each to be taught in a multiple activity laboratory. The first two phases of the continuum were for Junior High students while Phase III and Phase IV were to be offered at the High School level. For the purpose of this study only Phases I and II will be discussed.

Phase I of the Alberta Plan was designed to introduce grade seven students to tools, machines, materials and processes found in a productive society (Ziel, 1971, p. 23). These students were provided with learning experiences that used Wood, Plastics, Metals, Ceramics, and Graphic Arts as they work with a product (project) to obtain an optimum learning experience in terms of stated objectives (Cochran, 1970, p. 75). The product or exercise would be chosen or designed by the teacher and sequential steps described to the student to follow to complete the learning experience.

Phase II of the Alberta Plan was designed to introduce grade eight and nine students to the various basic technologies found in the world of work while presenting potential career opportunities. These technologies included Electronic, Graphic Communication, Computer, Power, and Mechanical (Ziel, 1971, pp. 28-31).

Ziel received support for the Alberta Plan to be taught in a multiple activity laboratory from influential educators in the province such as: Dr. Coutts, Dean of the Faculty of Education and Dr. Byrne, Chief Superintendent of Schools for

the Department of Education (Smith, 1973, p. 153).

Another influential person was J.D. Harder, an innovative industrial arts teacher who liked the plan proposed by Dr. Ziel. When Harder joined the Department of Education as Supervisor of Industrial Arts, September 1, 1963, (Department of Education, 1964, p. 12) he took on the task of persuading school boards, school superintendents, school administrators and industrial arts teachers to change the organization and structure of industrial arts in Alberta.

The multiple activity organizational pattern for industrial arts was a radical departure from the unit or general shop that was used in Alberta schools prior to the 1960's (Smith, 1973; Roskewich, 1990). The multiple activity concept was slow to be adopted by industrial arts teachers in Alberta schools because of the internal resistance of these teachers who were satisfied to teach in a general shop. To help negate this vested interest Harder, "developed a slide presentation which showed the layout of the multiple-activity laboratories, students working at various work stations in the laboratory, and an outline of the proposed multiple activity program" (Smith, 1973, p. 88).

Harder used this teaching aid to convince school administrators and teachers to initiate change for industrial arts. The transition to the multiple activity laboratory from the general shop as the learning environment to teach industrial arts took place as school boards throughout the

province built new schools or renovated old facilities. The predominant teaching environment for industrial education at the grade 7, 8, and 9 levels in Alberta at the time of the study is the multiple activity laboratory.

The University of Alberta, because it had no space on campus for multiple activity laboratories for its industrial arts teacher education program, through the cooperation of the Edmonton Public School Board, shared the industrial arts facility at Hillcrest Junior High School to teach prospective industrial arts teachers in the environment of a multiple activity laboratory (Roskewich, 1990, p. 50). In 1964, the University moved its multiple activity laboratory from Hillcrest Junior High School to the basement of the "J" wing of the Northern Alberta Institute of Technology (N.A.I.T.). These laboratories remained at N.A.I.T. until 1968 when they were moved to the temporary laboratories on campus at the University of Alberta. The teaching of instructional content in these multiple activity laboratories regardless of their location was presented by either professors of the department or sessional appointees (Roskewich, 1990, p. 53.; Personal Interview, C. Preitz, August 29, 1988).

When university personnel made the decision to organize its laboratories as multiple activity laboratories they found a move would have to be made from the traditional teacher dominated, group oriented, teacher-directed environment to a student-dominated learning environment. The role of the

teacher in this environment would have to change radically, if the learner was to be positively motivated, and if the learner was to be provided with the requisite skills in the three learning domains (Preitz, 1968). The role of the teacher in this highly organized environment becomes that of manager and a facilitator of learning rather than a dispenser of knowledge. The teacher is more concerned with adjusting instructions to the learner's ability and with having the learner accept the responsibility for learning through the individualization of instruction. The teacher's role takes on these characteristics:

> the teacher becomes an identifier of learning problems and a facilitator, guide and resource person who is responsive rather than directive about student needs. As a teacher-manager he is responsible for stimulating the student to want to learn the selected content, managing the learning environment so that the student maximizes his instructional time; providing resource materials to help solve the student's educational problems; and helping the student plan and evaluate the effectiveness of the outcomes of learning. (Preitz, 1973, p. 91)

Many of the traditional learning methods normally used with a teacher-dominated classroom or instructional area requiring passive learner involvement were found inappropriate for a multiple activity laboratory. Teaching methods selected were those that made provision for discovery learning that could be used with a variety of instructional formats and that the teacher could use with various alternative approaches for achieving an instructional objective (Preitz, 1973). Chief among the teaching materials

that were selected was Pictoral Programmed Instruction (PPI) which was developed by the professors responsible for teaching the materials laboratory. Pictoral Programmed Instruction, as a form of instructional material, has been described as a:

> method of teaching which consists of a series of precise descriptive statements with a supporting photograph for each statement. Both the statements and the photographs are logically and sequentially organized to describe or illustrate elements of an operation or a procedure for a process that the student is to learn. These statements and photographs are designed to transmit information to the student in the most direct manner possible and require an overt response by the student replicating some type of "hands on" experience. (Preitz, 1973, p. 16)

This form of instructional material is considered to be a learning activity that is self-instructional and which permits the student to complete the activity and fulfil predetermined performance objectives independent of other members of the class (Graham, 1983). PPI to be effective as instructional material must be integrated with other supplemental instructional materials such as: transparencies, single concept films, film strips, textbooks, motion pictures, small group or individual demonstrations. The texts are either operation or process specific.

Pictoral Programmed Instruction has as its foundation the principles of programmed instruction which resulted from the reinforcement theory, operant conditioning, of B. F. Skinner.

In 1963 J. D. Harder was appointed as supervisor of

Industrial Arts with the Department of Education. After visiting the Hillcrest Junior High School where he observed both the university program in operation and the junior high school students working in a multiple activity laboratory, Harder became convinced the future organizational pattern for industrial arts was the multiple activity laboratory. Through the influence of Harder, industrial arts facilities in the province began to be redesigned as multiple activity laboratories.

Curriculum committees were formed to work on interim editions of curriculum guides for both Junior and Senior High School Industrial Arts. The laboratories, where the instructional content found in the curriculum guides was to be taught, were organized as multiple activity laboratories with a number of coterminous bays (areas). In each bay either a material or a technology was to be taught. These materials included the study of Metals, Plastics, Woods and Earths. The technologies studied included Power and Graphic Communications. Each bay accommodates from four to six students and is equipped with sufficient tools and equipment to permit six different activities to be taught concurrently in the laboratory. Central to this organizational pattern is that provisions be made for each student to work independently and progress at his own rate of development--individualization of instruction.

During the early stages in the evolution of the Alberta

Multiple Activity Program, several attempts were made by industrial arts teachers to produce a basic set of instructional materials all of which proved to be unsuccessful. Among the instructional materials that were developed was a comprehensive set of workbooks which were not readily accepted because: the reading ability of the learner was low and consequently, when the learners had to work with a workbook their motivation quickly dropped; the students were required to fill in blank exercises in the workbook; and the cost of the workbooks was a major concern for the student. The Department of Education authorized the writing of workbooks for Visual Communications (Reinders), Metals (Franf), Plastics (Moench), Power (Moretta), and Wood (Neufeld) (How We Arrived at Where We Are, mimeographed, undated).

It was found that the PPI texts being produced at the University were not of the level suitable for junior high school student, because of the specificity of these texts for either an operation or a process. However, an appropriate technique for organizing instructional material had been identified. The format of PPI was slightly redesigned by M. Shykora of the Edmonton Separate School Board so it would be suitable to be used with junior high school students. What Shykora did to change the format of the PPI was to simply move the photograph above a short descriptive statement. The statement described what the student was to to do in

replicating what was shown in the photograph. Following this new format several booklets were produced with the collaboration of Separate School Teachers and personnel of Addressograph Multigraph and the resulting booklets were labelled Sequential Pictorial Instruction (SPI). A major stumbling block of these locally produced booklets was provincial distribution.

A request was made that the Industrial Education Specialist Council of the Alberta Teacher's Association to establish an Instructional Materials Committee (IMC) to work out selection, production , and distribution problems. The IMC was established and a limited number of SPI booklets were produced.

The Calgary Board of Education was the last major school district in the province to accept the multiple activity laboratory organizational pattern for the learning environment for industrial arts. Sometime between 1969 and 1973, Dr. A. E. Morris of the Calgary Board of Education established a committee of industrial arts teachers to compile a comprehensive set of student learning materials for junior high school students based on the PPI format. To assist with this task, committees were struck for: Materials, Graphics/Power, and Publication. The instructional materials that were developed by these committees were labelled Articulated Instructional Development Booklets which became known by the acronym AID booklet. The basic element of an

AID booklet is, "to show and tell" the "what and how" to a junior high school student as he proceeds to perform a process or formulate a product" (Preitz & Morris, 1979, p. 265). The AID booklet became an integral part of a learning activity package that is used by industrial arts teachers with students in a junior high school multiple activity industrial arts laboratory to individualize instruction.

According to Smith (1972) a learning activity package is "a form of communication between the student and the teacher that contains instructions for student activities leading toward specified performance outcomes" (p. 24).

Components of a LAP [learning activity package] include: a title - stating the main idea; a rationale - explaining why and how the package fits into the scope and sequence chart; the prerequisite - statement of prior knowledge required; the objectives - what the student must do to complete the package; a self evaluation - a pretest to indicate to the student his weak areas; special student directions - where the student is to do the activity; learning activities - the heart and the core of the package, telling the student the choices and descriptions of the activities he can choose; and teacher evaluation - post test to see if objectives were attained (Smith, 1972, pp. 24-25).

LAPs for Alberta's Multiple Activity Program at the junior high school level include AID booklets, project plans, safety sheets for the machines, material, or process being

taught, quizzes, and small group demonstrations.

It should be evident from the above discussion that the role of the student and the role of the teacher changes drastically in a learning environment where AID booklets are used and is organized for the individualization of instruction. The role of the learner is to become active and to accept full responsibility for learning which is performance objective directed. The role of the teacher changes so that the teacher becomes a diagnostician of students' learning problems, a facilitator of learning resources, and an instructional material designer.

Classroom Management

The concept of classroom management has evolved on a parallel with the concept of educating students in groups. Early methods of education used either an individual tutor or an apprentice setting where management of the student was done as an outreach of the instructor's home or business. The grouping of students into groups (classes) for instructional purposes introduced both problems and duties for the teacher. These problems and duties became the catalyst for the concept of classroom management.

When comparing the duties conducted by the teachers in the modern classroom and the single room schoolhouse of a century ago, several similarities are evident including; established and practiced rules of some sort, and fixed items

of space and time were allocated to activities designed for learning.

"Classroom management" is a term comprised of two parts, each requiring an explanation. The Facts on File Dictionary of Education defines classroom as, "a space designed or adapted for regularly scheduled group instruction. This includes the so-called regular classrooms and special use classrooms such as laboratories and shops but excludes such rooms as auditoriums, lunchrooms, libraries, and gymnasiums" (p. 99). In describing a classroom Doyle (1979) wrote, "a classroom is an institutionalized setting for teaching. In its most common form it is a place where a teacher and twenty to thirty students meet regularly for a designated period of time" (p. 44). The description of a one room school differs considerably from the description of a modern secondary school classroom yet, each complies with the definition. This comparison reinforces the statement that a "classroom" has reference to a wide variety of situations. Classrooms vary in their size, group character, and instructional purpose (Johnson & Brooks, 1979, p. 19).

Management, a necessary function of any organization, is described by Johnson and Brooks, (1979), in Conceptualizing Classroom Management: "management is that function . . . that concerns the coordination and cooperation necessary for goal attainment" (p. 22). The basic functions of management according to Johnson, Kast, and Rosenzweig, (1963), are: " 1)

to organize or coordinate people and resources; 2) planning, by which objectives and procedures are selected; 3) control, by which the conformity of performance to plans is assured; and 4) communication, by which information is transferred both internally and externally" (p. 13).

The term "classroom management" is described by Johnson and Brooks (1979) as, "the performance of certain tasks with certain elements in behalf of certain values" (p. 29). These same authors list the elements of management that a classroom manager can manipulate: "time, space, personnel, material, authority, responsibility, reward and punishment" (p. 29). Johnson and Brooks in 1979 described some of the elements of management. Time is controlled by manipulating the order and duration of activities; space is managed by considering the amount and type of area required for various activities to occur; personnel are managed by forming various groups of pupils and assigning various activities; material, a major concern of a practical arts teacher, is managed by storing, taking inventory, maintaining and repairing equipment, distributing and collecting, reordering used or worn out tools or supplies; authority is managed by giving the teacher the right to impose duties on students and also the duty of the teacher to respect student rights; responsibility is controlled by giving the students and teachers the freedom to perform duties and also holding them both accountable for this freedom (pp. 29-30).

The tasks a manager performs can be identified as: "a) planning (programming, decision making); b) organizing; c) coordinating (administering); d) directing (commanding); e) controlling (reappraising, monitoring); f) communicating (reporting)" (Johnson and Brooks, 1979, p. 32).

The Dictionary of Education describes classroom management as, "the organization and procedures used by teachers to create a classroom environment that is conducive to effective learning by students. Classroom management is not synonymous with classroom discipline. On the contrary it is a proactive, preventative strategy to establish the classroom as an effective learning environment" (p. 99).

Classroom management is a difficult term to define as most authors write about the topic without citing a definition. However, Daniel Duke (1978), referred to classroom management in this way, "Classroom management constitutes the provisions and procedures necessary to establish and maintain an environment in which instruction and learning can occur" (p. xii). Duke (1982) added, "The critical element of a teacher's role thus shifts from control to management - management of time, space, materials, auxiliary personnel, and students" (p. vii).

The central and ultimate source of classroom management is the teacher. Davies (1967) in the preface of Mager and Beach, Developing Vocational Instruction describes the teacher's role as being a person dealing with two kinds of

activity: that of either managing learning resources or else operating as a resource (p. v). Davies (1967) further explained the difference between a manager and an operator when he wrote:

> When a teacher deliberately creates a learning environment in his classroom with a view to realizing predefined objectives, he is acting as a manager. When the same person physically teaches in that classroom, he then becomes one of his own resources and takes on the role of the operator. (p. v)

If teaching is the facilitation of learning, then the major portion of a teacher's job should be that of the manager of resources. Davies (1967), isolates and describes the four functions of a teacher-manager into planning, organizing, leading, and controlling (p. vi). A teacher-manager "plans" when:

> he attempts to forecast future requirements, define the objectives which will have to be realized, write a syllabus of instruction, determine the order in which the topics will be studied, allocate the time available, and budget for the resources involved. (Davies, 1967, p. vi)

Davies (1967) describes the teacher-manager organizing function as involving, "the deliberate creation of a learning environment, and delegation of responsibilities" (p. vi). The leading function of a teacher-manager surfaces in, "the guidance, encouragement, and inspiration which he communicates to his students"(p. vi). The control function of the teacher-manager centers around evaluating student performance against previously established performance objectives (Davies, 1967, p. vi).

In support of Davies, a special report by Education USA (1981) states, "teachers are managers of both instruction and people (students). Effective teachers establish a climate conducive to learning, and as managers of instruction, teachers establish guidelines, communicate expectations, establish routines and pace instruction according to the student needs" (p. 48).

Classroom Management and Industrial Education

Under the Alberta Multiple Activity Program the industrial education teacher has the ultimate responsibility for the management of the laboratory. Long before any group of students enter the laboratory a considerable number of hours of planning, organizing, coordinating, and programming have to be spent by the teacher to develop and equip the laboratory. For any teacher, to be successful at teaching industrial education under this program, the majority of their management duties must be "front end loaded" long before the first student arrives.

Some of the main duties the industrial education teacher teaching in a multiple activity laboratory would have to perform in the planning, organizing and coordinating of this facility include:

a) study the provincial curriculum guide to determine what areas of study could be taught in the facility that is available.

b) consider the local community requirements, as well as,

examining personal competencies, skills, likes or dislikes of the teacher to determine what areas of study to plan for.

c) communicate with supervisors, and school administrators about the program areas that are planned to be taught.

d) plan a scope and sequence chart of the curriculum as well as for each individual area of study.

e) decide if the laboratory layout, and the tools and equipment is appropriate for the activities the students are expected to perform.

f) decide on what content activities and processes to teach so supplies and instructional material can be developed or bought.

g) develop or buy the software (instructional material) required to teach the selected objectives of each area of study.

h) plan on some system for student advancement and rotation throughout the different subject areas.

i) decide on a useful system for record keeping applicable to a multiple activity organization.

k) plan and develop the storage system for supplies, tools and equipment.

m) decide on the evaluation procedures and feedback system to be used in the presentation of program content.

n) plan out a system for safety instruction and evaluation.

o) become familiar with the school board's system for

ordering supplies.

Once the above details are taken care of the teacher can start to concentrate on duties regarding the management of the laboratory which includes students, their time, their activities, and the daily class operating procedures of the teacher. Silvius and Curry (1956, 1971) wrote extensively on the teaching and management of multiple activities in industrial education. In their writing, these authors describe how industrial arts teachers should: develop contemporary projects; write project teaching plans; provide for students to plan projects; indicate where teacher stop checks occur to control quality or the student work; set up a student organization; maintain class morale; deal with individual discipline problems; provide help for students needing personal assistance and; provide personal, educational and occupational guidance.

When an industrial education teacher under the Alberta Multiple Avtivity Program divides a class of students into several groups to work simultaneously in the various areas of the laboratory to work on different processes or projects, an AID booklet, a PPI text, or some form of teacher developed instructional material may be used to deliver instructional content to each student in different areas of the laboratory. How to deliver instruction simultaneously to students in different locations in a multiple activity laboratory is one problem faced by many industrial education teachers.

Classroom management of a multiple activity laboratory is a major concern which is time consuming, a problem area and a challenge for any dedicated teacher.

Related Research

A review of literature that reports the findings of research was conducted using electronic and physical means. The electronic data base searched was Educational Resources Information Center (ERIC) using compact disk read only memory (CD-ROM). Descriptors used in the ERIC search between 1983 and 1990 included: individualized instruction, industrial education, industrial arts, and technology education. This search resulted in 33 hits. After studying the CDROM printout sheets on these hits, one book was selected for further study because the title, Individualized Systems of Instruction in TAFFE Colleges revealed a possible connection to this study. This book was used as background information for this thesis and deals with individualized instruction in vocational education courses at the post secondary school level in Australia. All the other 32 hits were discarded because of their remote topics that were not suitable for this thesis. The standard indices; Canadian Education Index, Education Index, Canadian Index to Journals in Education, and Dissertation Abstract International used to report the findings of educational research were manually searched by the investigator. This helped to identify a number of masters' theses and two doctoral dissertations that have some

relationship to the current study. The masters' theses were completed by Albertans as they fulfilled the requirements for a masters degree. Among these were: Roskewich (1990), The Attitudes of Alberta Industrial Arts Teachers Toward Their Preparation; Mathew (1984), Industrial Education in Alberta its Evolution and Development: 1968 - 1982; Smith (1973), The Development of Industrial Arts Multiple Activity in Alberta. Similarly, the doctoral dissertations were completed to meet degree requirements. One dissertation was completed at the University of Alberta, Ross (1976), An Assessment of the Alberta Industrial Arts Teacher Education Program. The second dissertation was completed at the University of Northern Colorado, Morris, (1971), Analysis of the Perceptions of Students with Respect to the Mechanics, Content and Utilization of Articulated Instructional Development Booklets.

Roskewich (1990)

This researcher surveyed (120) of (475) industrial arts teachers in the province to determine the attitudes they held toward the effectiveness of their preservice preparation. Although the findings of this researcher has little or no relationship to this study, Roskewich does devote a portion of his second chapter to the evolution of the industrial arts teacher education program.

The content of that chapter was used by the current researcher in preparing the description of the overview of

the Alberta Plan. That plan is reported in detail in a previous section of this chapter.

Although Roskewich did make a contribution to the literature for industrial arts in the province, he did not describe the instructional materials that were used by industrial arts teachers to individualize instruction in this subject area. Nor did he identify how instructional materials can be used by an industrial arts teacher to help manage a multiple activity laboratory.

Mathew (1984)

The purpose of the research completed by Mathew was to, "describe the evolution and development of the industrial education concept and how this concept helped to synthesize vocational education and industrial arts under this generic term" (p. 2). In writing his thesis Mathew's third chapter describes an overview of the evolution of industrial arts as a subject area in Alberta.

After reading the content of that chapter it helped to clarify in the mind of the researcher how the multiple activity laboratory evolved and was accepted by school administrators and industrial arts teachers in the province.

Like Roskewich, Mathew did not discuss nor did he relate how instructional materials were used to individualize instruction in a multiple activity laboratory. Mathew also did not discuss the relationship that instructional materials had to laboratory management.

Smith (1973)

The title of the thesis completed by Smith was The Development of Industrial Arts Multiple Activity in Alberta. The major purpose of that research was, "to examine the development of the Industrial Arts Multiple Activity Program which has become [1973] the generally accepted Industrial Arts program in Alberta" (p. iv).

In this descriptive study, Smith examines the philosophy and objectives of the industrial arts program of Alberta, teacher preparation, and facilities at the secondary school level where industrial arts was taught. Like the researchers that followed him Smith did not devote any portion of his research to the topic of the current study.

In his report, Smith provides a description of the multiple activity concept and its evolution which helped the researcher develop a better understanding of this concept. It also served to provide the researcher with perceptions that were used in preparing the section of this chapter which describes the Alberta Multiple Activity Program.

Two Doctoral Dissertations were identified that were related to this study. These were the dissertations completed by Ross (1976) and Morris (1971).

Ross (1976)

Ross completed the requirements for the doctorate at the University of Alberta and did An Assessment of the Alberta Industrial Arts Teacher Education Program. The purpose of

that research was to determine the perceived view that industrial arts teachers had toward the teacher education program that provided them with the competencies they needed to teach this subject area in Alberta.

Ross, as a researcher, placed heavy emphasis on the psychomotor competencies that were taught in skill development courses taught in University laboratories by department personnel. The different procedures used by professors to teach these skills was totally ignored, although the University laboratory where materials was taught was organized by the professor to individualize instruction. This laboratory was where Ross taught, but he elected not to include this fact in his report. That part of the Ross study that dealt with industrial arts teacher preparation perse was found to be useful to the current study, the reason why it is included in this section of the report.

Morris (1971)

In completing the requirement for the doctoral degree at the University of Northern Colorado, Morris completed a survey of student attitudes toward Articulated Instructional Development (AID) booklets. Morris planned on using the AID booklet as a method of presenting instructional content to students enrolled in Alberta's Multiple Activity Program, which was offered to students of the Calgary Board of Education. The main purpose of this research was to formalize the format of the AID booklet. During the various

phases of his research, Morris was concerned with the students reaction to booklet mechanics, content and usefulness. From the results of the study, standards evolved which the teacher-author used in writing the AID booklets.

The study reported by Morris is slightly related to the current study because both deal with instructional methods used with individualizing instruction in the Alberta Multiple Activity Program and how this method can be used to assist the teacher to manage the laboratory.

Summary

Some form of industrial education has been taught in Alberta during and following its territorial period. Prior to its entrenchment as an identifiable secondary school subject area this practical subject was first known by educators as "manual training". For a brief period it was known as "manual arts", and since the end of World War II it was termed "industrial arts". A recent trend among provincial educators is the use of "industrial education" as a replacement term for "industrial arts", a subject area generally taught in a unit shop.

During its contemporary period, "industrial arts" in Alberta has been taught in a learning environment classified as a multiple activity laboratory. Dr. Ziel, in the early 1960s, was the educational leader who was instrumental for bringing the multiple activity program for industrial arts at the secondary and post secondary school levels to Alberta.

Financial assistance through the federally sponsored T.V.T.A. gave support to the University to establish the Division of Industrial and Vocational Education (now (1991) the Department of Adult, Career and Technology Education). The results of this catalytic development are now operating in schools throughout Alberta.

Teacher educators at the University of Alberta offer a program of study that provides the student with both a pedagogical and skill base to teach industrial education in a multiple activity laboratory. However, not all teachers currently teaching this subject received this training. These teachers are coping with a myriad of problems as they attempt to meet the requirements established by the Department of Education curriculum guide.

Classroom management is a main function that an industrial arts teacher must face within an industrial arts facility organized as a multiple activity laboratory. Teacher success with management duties helps to assist in the control and the operation of the program. Management of an industrial arts multiple activity laboratory requires the teacher to be highly organized and prepared to offer "mini courses" in many different fields of study, simultaneously, with students who are heterogenously grouped according to ability, intelligence, and interests.

When the organizational pattern for the industrial arts facility was determined as a multiple activity laboratory, it

was found that instruction had to be individualized. It became evident that the role of the teacher and the student would change drastically. Some teachers who made the transition from conventional teaching to individualizing instruction used this form of teaching as a way to help them with their classroom management.

Technological developments together with instructional technology have provided the means to simplify and to assist with the teaching and classroom management duties associated with the individualized programs.

Research studies, that were completed and that were related to this research, provided information on the evolution of the Alberta Multiple Activity Program, and student opinion on the AID booklets that were used to individualize instruction within the program.

Chapter III

Methodology and Analysis of Data

Introduction

The content of the previous chapter contains an overview of the evolution of individualized instruction in education, the development of the Alberta Multiple Activity Program, classroom management as it is defined by leading authorities, and an explanation of how classroom management and industrial education interrelate. Research related to this study was identified and presented.

This chapter will present descriptions of how the instrument was designed, of how the sample was drawn and how the data were organized for computer data entry. Also included is a brief description of the data analysis program SPSS/PC+ and why it was selected for analyzing the data that were received from the teachers who participated in the study. A major portion of the chapter will be devoted to an analysis of the data collected with a two part questionnaire.

Methodology

Instrumentation

After examining the advantages and disadvantages of the mailed questionnaire the researcher decided to use this method to collect data because of economic reasons. The geographical distribution of the research sample and the size of the geographical area being surveyed precluded that the

mailed questionnaire be used as the method to collect data for this study.

A search of previously designed questionnaires that were used by researchers in industrial education or others who have investigated individualized instruction, yielded little in instrument format that could be replicated in the current study. As a result a questionnaire specific to the study had to be designed.

Examples of two questionnaires used in previous research were used as guides to structure the instrument for this study. These two questionnaires were; 1) The Special Education Survey Questionnaire administered by the Special Education Council of the Alberta Teachers' Association and 2) a Programmed Instruction Questionnaire in Nursing by David Cordova in Instruments for Use in Nursing Education Research by Ward and Fetler (1979).

The instrument designed for this study consisted of two parts. Part A contained 52 statements or questions which respondents were asked to respond to, using a five point Likert rating scale. Participants were asked to select one of the following choices from the Likert Scale; "strongly agree", "moderately agree", "undecided", "moderately disagree", and "strongly disagree". Part B included eight questions seeking demographic information from the teachers involved in the research.

The instrument design was reviewed by an instrument

design specialist, University of Alberta, who checked the instrument for format, questioned the researcher as to the use of the instrument to collect data and type of data to be collected, and suggested methods to organize data for analysis. Following this review the questionnaire was revised and pilot tested with six junior high school industrial education teachers employed by the Calgary Roman Catholic School System, District #1. These teachers were used because they were readily available to the researcher and they were not part of the research sample. This phase of the study was conducted to identify statements that were ambiguously worded, poorly phrased, or out of sequence. Another purpose of the pilot study was to determine the average amount of time it took one to complete the instrument. From the results of the pilot study, the instrument was revised before it was used in the major portion of the study.

Part A of the questionnaire was composed of Sections I and II and for data analysis these two sections were subdivided into four sub-sections. Each sub-section was organized around one of the four supporting objectives that were formulated in support of the problem statement.

Part B of the instrument was comprised of eight questions that were used to obtain background information from the teachers in order to establish a participant profile for this study.

Correspondence was initiated with the Assistant Director, Curriculum Design Branch, Alberta Education, requesting that he cooperate in the research by supplying the researcher a list of "Industrial Education Teachers by School Name" who are teaching in the province. Also the "List of Schools Operating in Alberta" was requested. Both lists were readily provided.

The latter list provided the researcher with the name of the school jurisdiction, the name and address of the superintendent, plus a listing of constituent schools that included the principal's name, school addresses, and grades taught. The industrial education teacher list provided the names of the teachers, and the name and address of the schools where these teachers taught. There was no indication on this list as to what grade level the industrial education teacher taught. Therefore both lists had to be cross referenced to determine which schools provided Industrial Education at the grade 7, 8, and 9 level and which schools provided Industrial Education 10, 20 and 30 at the senior high school level. Schools that offered industrial education at the senior high school level were omitted from the study. The list of schools which provided junior high industrial education was stratified into urban and rural. School jurisdictions with a county classification were placed into the rural group. School divisions, districts and private schools were placed into the urban group. The two groups

were aggregated and a random sample was drawn fulfilling the 2:1 urban to rural ratio established for the study. To select the random sample the procedure recommended by Levin and Fox (1988) in Elementary Statistics in Social Research was followed.

Participants selected for this study were granted anonymity by the researcher and had the right to withdraw from the research without prejudice as outlined in the rules and regulations of the Ethics Review Committee of the Department of Adult, Career and Technology Education.

Superintendents from the Edmonton Public School Board, Edmonton Catholic School System, County of Strathcona, and St. Albert Protestant Separate School District # 6, 90 superintendents of 152 school jurisdictions in Alberta were contacted by mail to ask them to cooperate in the study by granting the researcher permission to involve the industrial education teachers within their jurisdictions the opportunity or freedom to participate in the study. Superintendents who provide educational leadership to school districts in metropolitan Edmonton were contacted through the Cooperative Activities Program, Field Experiences, Faculty of Education, University of Alberta.

Eighty-eight of 94 superintendents granted the requested permission. Four superintendents failed to respond to the request therefore these jurisdictions were eliminated from the research. Two additional jurisdictions declined to

participate in the study, one was a major separate school jurisdiction in northern Alberta and the other was a small county jurisdiction in central Alberta. As a consequence, the population from participating school jurisdictions had to be re-randomized in order to form the targeted ratio sample size of 2:1. The rate of return for superintendents granting consent was 93%.

One hundred and fifty out of 376 or 40%, of the junior high school industrial education teachers teaching in the province were randomly selected to participate in the study. The sample consisted of 100 urban and 50 rural industrial education teachers. Four of these teachers were eliminated from the study because their superintendent failed to grant permission to involve them in the investigation. As a result 146 research packages which included a cover letter, a questionnaire, and a stamped self addressed return envelope were sent to the teachers selected to be involved in the research. Appendix B, page 214, contains a copy of the covering letter and the research questionnaire. By the deadline date established for the completion of questionnaires, 95 were received for a 65% return rate.

Returned questionnaires were examined and checked off on a master mailing list to record participants who did not return instruments. In a effort to increase the rate of return a follow up procedure was initiated. This procedure included a letter which accompanied the research package that

was mailed to those participants who did not meet the established deadline. This procedure yielded an additional 9 questionnaires which increased the number of returns to 104 from 95 for a rate of return of 71%. Ninety-five of the 104 returns were usable. The remaining nine instruments were discarded for these reasons: four teachers opted out of the study; two teachers were on medical leave; one teacher transferred to another school district; one teacher retired; and one teacher died before being able to complete the questionnaire. Appendix B, page 214, includes a copy of the follow-up letter.

Collected data from each instrument were transcribed on to a spread sheet for ease in reading data for computer entry.

The data analysis package used in data processing was the Statistical Package for the Social Sciences (SPSS). One reason SPSS was selected is because Polit and Hunger (1991) stated "For people with limited statistical and computer backgrounds, SPSS is relatively easy to learn" (p. 541). In addition this analysis package is available in a microcomputer version called SPSS/PC+. A studentware version of SPSS/PC+ was used by the researcher to establish frequencies and percentages for the data that were collected. These data were placed in tabular form for ease of interpretation and analysis.

The data were divided into 5 separate sub-sections for

analysis in order to accommodate the limited capabilities of the studentware version of the analysis package and to match the data groupings of the four supporting objectives and questionnaire design.

Analysis of Data

Part A Section I

The format for presenting the analysis of data collected parallels the design of the research instrument. Part A of the research instrument was composed of Section I which pertained to supporting objectives I and II. For data analysis, Section One was divided into sub-sections I and II each of which coincided with one of the supporting objectives. Section II of the research instrument was divided into sub-sections III and IV. The latter two sub-sections coincided with supporting objectives 3 and 4.

Chart I shows the relationship of each management element to the appropriate statement number from Section I in the research questionnaire. These ten statements for data analysis formed sub-section I.

In compiling this report every effort was made by the researcher to keep each table in proximity to its analysis. As a result of that effort the reader will find white space through this section of the report.

Chart I

Relationship of Management Element to Questionnaire Statements For Supporting Objective I

Management Element	Statement Number
Space	1, 2
Time	3, 4
Students/personnel	5, 6
Equipment/materials	7, 8
Content	9, 10

The first supporting objective was stated in this way:

> To determine if individualized instruction complements the classroom management methods used by junior high industrial education teachers teaching in a multiple activity laboratory.

Space allocated to a module or area of study in a multiple activity laboratory is one of the elements which teachers have control over when managing an industrial education program. The first two statements on the questionnaire pertain to the element of space allocation. Statement # 1 asked:

> Efficient laboratory space usage is best accomplished by the teacher assigning students to simultaneously work at all stations throughout the laboratory.

Table 1 is the frequency table for data obtained from 95 participants who responded to the above statement.

Table 1

Efficient Laboratory Space Usage

N=95

Rating	Frequency	
	Number	Percent
strongly agree	44	46.3
moderately agree	37	38.9
undecided	5	5.3
moderately disagree	6	6.3
strongly disagree	3	3.2
Total	95	100.0

An examination of data in Table 1 reveal when the "strongly agree" and the "moderately agree" ratings are aggregated, 81 of the 95 teachers or 85.2% were in agreement that the efficient use of laboratory space is best accomplished when a teacher simultaneously makes use of all areas of the laboratory when teaching junior high school students.

The second statement sought additional information that applied to the allocation of the physical space of the laboratory by the teacher where the various fields of study of materials technology were taught. Participants were asked to respond to this statement:

Space allocated to a field of study in an

industrial education laboratory is set by the teacher.

The reaction of teachers involved in the study to this statement represent data presented in Table 2.

Table 2

Teacher: Fields of Study Space Allocation

N=95

Rating	Frequency	
	Number	Percent
strongly agree	43	45.3
moderately agree	43	45.3
undecided	0	0.0
moderately disagree	5	5.3
strongly disagree	4	4.2
Total	95	100.1[1]

[1] Total percent is greater than 100 because of rounding.

Data in Table 2 show that 90.6% or 86/95 of those who participated in the research indicated that it was the industrial education teacher who allocated space in the laboratory for the various fields of study. At the other end of the continuum, only 9.5% of the teachers either "moderately" or "strongly disagree" that laboratory space organization was not the responsibility of the teacher. Data collected with these two related questions on space management and space allocation is a significant factor when

managing a multiple activity laboratory to individualize instruction.

Teachers through their expertise and competencies can also control the amount of time that is provided to students to complete a given activity. The amount of time a student spends on an activity is also determined by the variable of the student's learning style. To determine teacher opinions on the time/learning style variable, the third statement on the instrument was stated in this fashion:

> Time allocated for students to complete activities should vary because of different student learning styles.

Table 3 presents data collected with this statement.

Table 3

Time Variation: Student Learning Styles

N=95

Rating	Frequency	
	Number	Percent
strongly agree	33	34.7
moderately agree	48	50.5
undecided	3	3.2
moderately disagree	9	9.5
strongly disagree	2	2.1
Total	95	100.0

These data show, that 48 of 95 respondents or 50.5% of

the participants "moderately agree" and 35% of the participants "strongly agree" that students should be given varying times to complete activities because of individual differing learning styles. Conversely approximately 12% of the participating teachers disagreed with the statement as presented.

Statement number 4 was also time related and was written to determine if participating teachers thought that the individualization of instruction allowed the teacher more time to work with students who need additional instructional time. Statement 4 was phrased for the participant rating, this way:

> Individualized instruction permits the teacher to devote more time to those students who need additional individual assistance.

See data in Table 4 for results of participant rating to the above statement.

Table 4

Individualized Instruction/Additional Individual Assistance

N=95

Rating	Frequency	
	Number	Percent
strongly agree	30	31.6
moderately agree	37	38.9
undecided	9	9.5
moderately disagree	14	14.7
strongly disagree	5	5.3
Total	95	100.0

An examination of data in Table 4 reveal that approximately 70.5% of the 95 teachers either "strongly" or "moderately" agree that the teacher by using individualized instruction, is able to devote more time to the slower achieving students.

By combining results from statement 3 and statement 4, it becomes evident that time and its relationship to student learning styles is an influential factor in the management of an industrial education program taught in a setting that is organized as a multiple activity laboratory.

The management of students through a student/personnel system is another factor which affects the operation of the

learning environment organized as a multiple activity laboratory. This system plays a major role in the control and management of the classroom. In this environment the teacher can control the method that students progress through the various modules of instructional content within this learning environment. Students can rotate through a module as a member of a group or as an individual. To collect these kind of data statements 5 and 6 were prepared.

Statement 5 asked:

> Simultaneous student progression by groups from area to area can place increased stress on the teacher at rotation time.

Data collected with this statement were used to organize Table 5.

Table 5

Teacher Stress: Student Area Rotation

N=95

Rating	Frequency	
	Number	Percent
strongly agree	41	43.2
moderately agree	20	21.1
undecided	9	9.5
moderately disagree	13	13.7
strongly disagree	12	12.6
Total	95	100.1[1]

[1] Total percent is greater than 100 because of rounding.

An examination of data in this table reveal that when the ratings of "strongly" and "moderately" agree were aggregated 61 out of 95 or 64.3% of the teachers agreed that it was stressful on the teacher when students rotate as groups. Conversely these data also show that 26.3% of the teachers disagreed. These teachers represented approximately one-fourth of the research sample.

To determine if the research sample thought that individualized instruction made student rotation through the modules easier to manage and was less stressful on the teacher than that imposed on the teacher by group rotation and group instruction, statement six asked:

Student rotation through modules as individuals may be easier to accomplish when individualizing instruction is used than when group rotation and instruction is used.

Data obtained with this statement can be found in Table 6.

Table 6

Individualized Instruction and Student Rotation

N=95

Rating	Frequency	
	Number	Percent
strongly agree	23	24.2
moderately agree	25	26.3
undecided	23	24.2
moderately disagree	14	14.7
strongly disagree	10	10.5
Total	95	99.9[1]

[1] Total percentage is less than 100 because of rounding.

An analysis of data in Table 6 reveal that when combined, the "strongly" and "moderately" agree groups comprise slightly over 50%, 48/95, of the sample who agreed that student rotation through modules made it easier for the teacher to manage when individualized instruction was used as a method of teaching. These data also show that 23, (24%) of the teachers who participated in the study were undecided as

to the effect individualized instruction had as a management strategy in a multiple activity laboratory.

Management of equipment and materials is a factor that industrial education teachers must cope with in the operation of well functioning laboratories. Statement 7 on the questionnaire was prepared to determine the effect lock-step teaching had on problems concerned with the management of equipment and materials. Statement 7 asked:

> Equipment and material management problems become intensified when groups of students are pressured to complete a set of activities within a fixed period of time.

Teacher ratings to this statement are presented as data in Table 7.

Table 7

Equipment and Material Management: Group Rotation

N=95

Rating	Frequency	
	Number	Percent
strongly agree	21	22.1
moderately agree	42	44.2
undecided	13	13.7
moderately disagree	15	15.8
strongly disagree	4	4.2
Total	95	100.0

Data in Table 7 show that when added together 63/95, (66%) responding teachers who either "strongly" or "moderately" agreed that equipment/material management problems did intensify when groups of students were under pressure to complete their assignments within a rigid time frame. Twenty-eight of the 95 participants were either "undecided" or "moderately" disagreed that a relationship did exist between pressure to complete a learning activity within a fixed period of time and equipment and supplies management.

Closely related to statement 7 was statement 8 which asked:

> Teachers can effectively control program and equipment repair costs by individualizing instruction and dispersing students into all areas of the laboratory to reduce student congestion.

In Table 8 are data that responding teachers provided.

Table 8

Equipment Repair Costs Controlled by Individualizing Instruction

N=95

Rating	Frequency	
	Number	Percent
strongly agree	10	10.5
moderately agree	31	32.6
undecided	19	20.0
moderately disagree	25	26.3
strongly disagree	10	10.5
Total	95	99.9[1]

[1] Total percent is less than 100 because of rounding.

Of the 95 participating teachers, 31 or (32%) rated that they "moderately agree" with this statement, 25 or (26%) rated that they "moderately disagree" and 19 or (20%) were "undecided", that equipment repair costs were reduced when individualizing instruction was used as a method of instruction that would permit students to work in all areas of the laboratory simultaneously.

Course content, presented in the curriculum guide is controlled by the rate that the teacher presents it, was identified as a management element in Chapter II. Teachers are equipped with a variety of methods of presenting course

content such as: teaching large groups, small groups or individuals while using different media like print and non-print instructional materials to supplement instruction. Industrial education teachers have an additional method of teaching which is to demonstrate equipment in the laboratory to the learner. Both statements 9 and 10 in the instrument place emphasis on the use of individualized instruction as an asset for the teacher to control students working with a variety of learning activities at the same time. Industrial education teachers who participated in the study were asked to rate the following statement:

> The increased use of individualized instruction may be a major asset to the teacher for controlling the numerous simultaneous student learning activities that are determined by course content found in the curriculum guide.

In Table 9 are data which illustrate the rating the 95 participants gave to this statement.

Table 9

Individualized Instruction: Content Management

N=95

Rating	Frequency	
	Number	Percent
strongly agree	12	12.6
moderately agree	39	41.1
undecided	23	24.2
moderately disagree	14	14.7
strongly disagree	6	6.3
missing data	1	1.1
Total	95	100.0

Data in the Table 9 show that "moderately agree" 39/95 (41.1%) was the highest rating received, which was an indication that individualized instruction may be an asset to a junior high school industrial education teacher as a means of controlling simultaneous student learning activities in a multiple activity setting.

The tenth statement on the questionnaire was phrased in this way:

> Students are individuals with varying learning needs and capabilities that are best met by a teacher providing a range of course requirements for student to achieve.

Ratings for this statement are organized in Table 10.

Table 10

Student Individual Learning Needs: Varying Range of Course Requirements

N=95

Rating	Frequency	
	Number	Percent
strongly agree	43	45.3
moderately agree	45	47.4
undecided	1	1.1
moderately disagree	4	4.2
strongly disagree	1	1.1
missing data	1	1.1
Total	95	100.2[1]

[1] Total percent is greater than 100 because of rounding.

An analysis of data in the above table reveal that, 88 of 95 responding teachers or 93% either "strongly" or "moderately" agree with the statement. These ratings give support to the concept that individual students with varying learning needs are more successful in a multiple activity laboratory where the teacher provides both a variety and a range of course requirements to the learner.

Sub-section 2 of Part A of the questionnaire consisted of statements 11 through 28 that participants were to rate using the five point Likert scale. Each statement was

related to one of the five management elements. Statements that were related to the second supporting objective are shown in Chart II.

Chart II

Relationship of Management Element to Questionnaire Statements in Support of Objective II

Management Element	Statement Number
Space	11, 12, 13
Time	14, 15
Student/Personnel	16, 17, 18, 19, 21
Content	20, 22, 25, 26, 27, 28
Equipment/Materials	23, 24

When industrial education teachers determine the amount of space to be allocated to an area of study in an industrial education laboratory, they do so only after consideration is given to other factors that are pertinent to class management. Several of these other factors are: projected class size, method of student progression between areas, and number of areas that are currently operating within the laboratory. All these factors must be considered before the teacher can decide on how much space to assign to a particular area.

During the student teaching portion of a prospective teacher's preservice education, student teachers are assigned

to do their student teaching in a laboratory that has already been organized by the cooperating teacher. Therefore it is unlikely that these student teachers would have the opportunity to make a major decision like allotment of space to areas of study within a laboratory until later in their career when they accept the task of establishing a new laboratory or renovating the one in which they will teach.

Statement 11 was prepared to determine if the teachers used the experiences they received as preservice teachers in the way they controlled their students and organized their laboratories.

> Some industrial education teachers emulate the teaching system by which they were prepared and prefer to use group rotation to operate and design their laboratories.

Data reflecting teachers' ratings to this statement were used to organize Table 11.

Table 11

Preservice Preparation: Laboratory Management

N=95

Rating	Frequency	
	Number	Percent
strongly agree	20	21.1
moderately agree	47	49.5
undecided	16	16.8
moderately disagree	8	8.4
strongly disagree	3	3.2
missing data	1	1.1
Total	95	100.1[1]

[1] Total percentage is greater than 100 because of rounding.

The aggregate of "strongly" and "moderately" agree ratings show that 67 of the teachers or 71% of the research sample, by their ratings, indicated that some teachers emulated the system which prepared them to teach and used that system to organize their laboratories.

The researcher wanted to determine if the expanded use of individualized instruction was being stifled because of teacher resistance to experiment with different organizational methods and methods of teaching in a multiple activity laboratory. These data were collected with statement 12 which asked:

Teacher resistance to experiment with a different method of organization and teaching industrial education in a multiple activity laboratory stifles the use and expansion of individualized instruction in this subject.

Data from the above statement is shown in Table 12.

Table 12

Teacher Resistance to Experiment: Individualized Instruction

N=95

Rating	Frequency	
	Number	Percent
strongly agree	21	22.1
moderately agree	34	35.8
undecided	18	18.9
moderately disagree	17	17.9
strongly disagree	4	4.2
missing data	1	1.1
Total	95	100.0

Approximately 58% of 95 participants indicated their support to the statement when they rated it either "strongly agree" 22% or "moderately agree" 36%. This support shows that teacher resistance to experiment with different laboratory organizational patterns stifles the use of individualized instruction in industrial education in a

multiple activity educational environment. However a significant portion of the research sample, 19% who were "undecided" and 18% who "moderately disagree" with the statement could be an indication that these teachers do not see the relationship between experimentation and the shift from teacher dominated instruction to student centred learning.

If a teacher is presenting instructional content to a class of students who are all doing the same activity then there is a very strong possibility that group instruction would be used. When teachers divide a class of students into several smaller groups to work simultaneously on several different activities the task of teaching these groups becomes more difficult. The more a teacher subdivides a class, to work concurrently in different areas of a laboratory, the more the demand for that teacher to employ a method of instruction leading toward individualization of instruction. Industrial education in Alberta at the junior high school level is therefore conducive to teachers using individualized instruction.

Ideally the design of a multiple activity laboratory should be organized so each area of the laboratory is a self contained unit that includes the various hand and machine tools that are used to work with either a material, a process, or a technology. Although the design of this educational space is conducive to the implementation of

individualized instruction, it presents management problems for the teacher. The next statement on the research instrument asked:

> The modular design for teaching multiple activity industrial education is conducive to using individualized instruction to teach in and manage a multiple activity laboratory.

Ratings given to this statement are shown in Table 13.

Table 13

Multiple Activity Laboratory: Use of Individualized Instruction

N=95

Rating	Frequency	
	Number	Percent
strongly agree	21	22.1
moderately agree	50	52.6
undecided	13	13.7
moderately disagree	9	9.5
strongly disagree	1	1.1
missing data	1	1.1
Total	95	100.1[1]

[1] Total percent is greater than 100 because of rounding.

An analysis of data in the above table reveal that 71, (76%) out of 95 participating teachers either "strongly agree" or "moderately agree" that industrial education taught in a multiple activity laboratory is conducive to the use of

individualized instruction as a strategy to present instructional content to the student.

Some of those teachers who use individualized instruction with a group of learners may become cognizant of the fact that this method of instruction is time intensive on the part of the teacher which may often lead to its abandonment. This method of instruction is time intensive for these factors: the time needed to complete the implementation cycle from design of the instruction, through piloting, revising, to implementing.

The following statement was used to determine how participants would react toward the value of using instructional materials to individualize instruction:

> The position of some teachers is that the mechanics involved in preparing and using individual instruction materials are so time consuming that these materials are not worth it.

Teacher ratings given to this statement are summarized in Table 14.

Table 14

Individualized Instruction Materials: Time Factor

N=95

Rating	Frequency	
	Number	Percent
strongly agree	24	25.3
moderately agree	32	33.7
undecided	18	18.9
moderately disagree	19	20.0
strongly disagree	1	1.1
missing data	1	1.1
Total	95	100.1[1]

[1] Total percent is greater than 100 because of rounding.

From an analysis of data in the above table it becomes evident that 56 of the 95 participating teachers agreed that teacher time required to prepare individualized instruction materials was too time intensive on their part to be of beneficial use to them. It is also evident from these data that 19 of the responding teachers took the opposite position that it was worth the effort of the teacher to prepare individualized instructional materials.

Closely related to statement 14 was statement 15:

> Would you make greater use of individualized instructional material if you were given release time to develop these materials.

Data collected with the above statement are tabulated in Table 15.

Table 15

Individualized Instruction its Increased Usage: Development Time

N=95

Rating	Frequency	
	Number	Percent
strongly agree	47	49.5
moderately agree	31	32.6
undecided	9	9.5
moderately disagree	5	5.3
strongly disagree	2	2.1
missing data	1	1.1
Total	95	100.1[1]

[1] Total percent is greater than 100 because of rounding.

Seventy-eight teachers involved in the research or 82.1%, when the ratings for "strongly agree" and "moderately agree" are aggregated, indicated that they would make greater use of individualized instructional materials if they were provided release time in which to develop these materials.

A major problem industrial education teachers often encounter when attempting to individualize instruction in an industrial education learning environment centres around

student or personnel management for class control. Student progression through the different areas of study can be accomplished through large groups, small groups, or the individual rotating through the different areas. The method of student rotation that is selected must be the decision of the teacher because of the necessity to maintain control of the class in this learning environment. Statements 16 through 19 as well as statement 21 were designed to obtain teacher reactions that were pertinent to student/personnel management problems in a multiple activity laboratory. Statement 16 was prepared as an attempt to get at the issue of a shift in instructional strategy to individualized instruction from group instruction and its relationship to the individualization of instruction. The statement that appeared on the research instrument stated:

> The task of teaching students through a different instructional method (individualized instruction) to what they were accustomed to, (group instruction), may hinder the teacher adopting individualized instruction as a teaching method.

How the 95 participants rated this statement comprise the data found in Table 16.

Table 16

Instructional Method/Individualizing Instruction

N=95

Rating	Frequency	
	Number	Percent
strongly agree	8	8.4
moderately agree	30	31.6
undecided	23	24.2
moderately disagree	29	30.5
strongly disagree	5	5.3
Total	95	100.0

Data from Table 16 show that participants were equally divided between whether they agreed or disagreed that the use of individualized instruction might hinder the teacher adopting learner centered instruction rather than teacher dominated group instruction. These data show that the percentage of respondents selecting "moderately agree" was 32% while the percentage selecting "moderately disagree" was 31%. Twenty-four percent of the teachers remained "undecided" on the issue described in the statement.

The use of individualized instructional materials and their design is time intensive for the teacher who in some instances may have a heavy class load or may not have the artistic ability to illustrate supporting statements of

instruction. To determine if teachers would make greater use of instructional materials if they had assistance in the design of these materials, the following question was asked:

> In your laboratory, would you make greater use of individualized instructional materials if you had someone available to assist you in preparing these materials.

Data collected with statement 17 can be found in the table below.

Table 17

Greater Use of Individualized Instruction: Assistance Provided

N=95

Rating	Frequency	
	Number	Percent
strongly agree	41	43.2
moderately agree	36	37.9
undecided	11	11.6
moderately disagree	2	2.1
strongly disagree	5	5.3
Total	95	100.1[1]

[1] Total percent is greater than 100 because of rounding.

An analysis of the data presented in Table 17 show that 43.2% of the research population "strongly agree" that they would make greater use of individualized instruction if they

had assistance to help prepare these kinds of instructional materials to support that type of delivery system. There were 5/95 whose rating was "strongly disagree" which indicated that even with support personnel to assist in the design of instructional materials these teachers would not use these materials to individualize their instruction.

Five of the statements of the research instrument concentrated on the management of student/personnel through the use of a number of techniques. The five statements were 16, 17, 18, 19, and 21. The techniques that teachers could utilize to help them manage students/personnel were: using spread sheets and charts to record progress; writing instructional material at the reading level of the students; using teacher aids to assist in the development of instructional materials; making accurate and precise simplified instructions for students to follow; and realizing that students at the junior high school level in their education need to socialize to complement their learning.

A charting procedure is one technique that authorities recommend be used to track student and record student progress. To determine if participants were using charts for the purpose of tracking students in their laboratories, statement 18 asked:

> Tracking student progress and recording it when using individualized instruction can be accomplished by the teacher using well organized charts as a system to record the progress of the individual student.

Table 18 shows teacher ratings from this statement.

Table 18

Charts to Record Student Progress

N=95

Rating	Frequency	
	Number	Percent
strongly agree	37	38.9
moderately agree	43	45.3
undecided	11	11.6
moderately disagree	3	3.2
strongly disagree	1	1.1
Total	95	100.1[1]

[1] Total percent is greater than 100 because of rounding.

An examination of data in the above table reveal that 45% or 43/95 of the participants were in moderate agreement that an industrial education teacher could track student progress in a multiple activity laboratory through the use of well organized charts. Only one teacher involved in the research strongly disagreed that charts should be used to track student progress.

Instructional material used to individualize instruction to be effective should be designed so it is written at the reading level of the learner or grade level for which it is

prepared. Participants were asked:

> Junior high students have the ability to read and comprehend simplified written instructions that are part of instructional material to individualize instruction.

Data from this statement are presented in Table 19.

Table 19

Junior High School Students Ability to Read Simply Written Instructions

N-95

Rating	Frequency	
	Number	Percent
strongly agree	16	16.8
moderately agree	49	51.6
undecided	13	13.7
moderately disagree	15	15.8
strongly disagree	2	2.1
Total	95	100.0

Forty-nine of the 95 teachers who rated the above statement "moderately agree", indicated by that rating that the junior high school students they taught had the ability to read written instructions which were written in simple terms and were concise and to the point. There were however, 15 of those responding who because they rated the statement" moderately disagree" took the opposite position that their

students do not have the ability to read instructions that are written in simple terms.

Educationalists agree that the majority of junior high school students are gregarious and like to work as a member of a group where socialization can take place. To determine if these teachers could accommodate students as a member of a group through the use of individualized instruction, statement 21 asked:

> A students' desire to socialize and work as a member of a group can be accommodated through a system to individualize instruction in industrial education.

Information obtained from the instrument returns that were pertinent to this statement were used to organize Table 20.

Table 20

Individualized Instruction to Accommodate Students

N=95

Rating	Frequency	
	Number	Percent
strongly agree	21	22.1
moderately agree	42	44.2
undecided	19	20.0
moderately disagree	10	10.5
strongly disagree	3	3.2
Total	95	100.0

From an examination of frequency and percentage columns of Table 20, it is evident that 42 of the 95 participants rated this statement as being in moderate agreement that students could work as a group member and socialize in industrial education where individualized instruction was part of the instructional delivery system. Twenty percent, 19/95, of the research population were "undecided" if students using individualized instruction could socialize and work as a group using that method of instruction.

Equipment as well as material management are two major problems for industrial education teachers who teach in a multiple activity laboratory because of the diverse types of equipment that need to be maintained and the variety of

supplies needed to be requisitioned and stocked within a limited budget. The researcher as an experienced junior high school industrial education teacher felt that less materials would be used by students in a learning environment where the individualization of instruction predominated. Statements 23 and 24 were written to determine if other industrial education teachers took a similar position. Statement 23 asked:

> Wastage of material may be reduced when industrial education is taught using the individualized instruction method.

Data from this statement is organized in Table 21.

Table 21

Individualizing Instruction/Material Wastage Reduced

N=95

Rating	Frequency	
	Number	Percent
strongly agree	7	7.4
moderately agree	21	22.1
undecided	27	28.4
moderately disagree	23	24.2
strongly disagree	17	17.9
Total	95	100.0

The analysis of data from statement 23 presented in

Table 21 show that there were 27 participating teachers who were "undecided" as to whether or not individualized instruction helped to assist to reduce waste of material in a multiple activity laboratory. Twenty-three of the 95 teachers through their moderately disagreed rating were of the position that by individualizing instruction an industrial education teacher could reduce waste.

In an industrial education laboratory the teacher is dependent upon functioning equipment for demonstrations, and for the students to operate in the performance of their required learning activities.

Equipment breakdowns in industrial education programs can hamper student progress because down time may be extensive and there is no alternate equipment replacement for the teacher to use. Every industrial education teacher wants to keep to a minimum the frequency and the severity of equipment breakdown. Equipment breakdowns occur on a more frequent basis in a multiple activity laboratory because of the number of students who need to use that equipment. To determine how those involved in the research felt about this situation statement 24 asked:

> Equipment breakdowns in the multiple activity laboratory are easier to manage when only one student is dependent upon a machine rather than when a group of students are dependent upon that machine.

In Table 22 can be found the ratings the 95 participants gave to this statement.

Table 22

Equipment Breakdowns: Student Usage

N=95

Rating	Frequency	
	Number	Percent
strongly agree	28	29.5
moderately agree	30	31.6
undecided	10	10.5
moderately disagree	20	21.1
strongly disagree	7	7.4
Total	95	100.1[1]

[1] Total percent is greater than 100 because of rounding.

The analysis of data obtained from the responding teachers for statement number 24 show that 32% of the 95 teachers were of the opinion that they "moderately agree" that industrial education equipment breakdowns are easier to manage when the equipment is used by individual students rather than by a group of students.

Course content is an element of classroom management that teachers may manipulate in their endeavour to maintain control of the classroom. Industrial education teachers are no exception to this rule and they may encounter various problems that are associated with content management in their laboratories. The following six statements: 20, 22, 25-28

represented problems teachers might encounter when managing content. One of these problems the teacher has to cope with is that of presenting directions to students. Statement 20 was worded in this way:

> Teachers should attempt to provide students with precise individual directions so the student can perform learning activities at their own pace.

Table 23 contains data collected with this statement.

Table 23

Precise Directions: Student Success

N=95

Rating	Frequency	
	Number	Percent
strongly agree	37	38.9
moderately agree	44	46.3
undecided	6	6.3
moderately disagree	8	8.4
strongly disagree	0	0
Total	95	99.9[1]

[1] Total percent is less than 100 because of rounding.

When the "strongly agree" and the "moderately agree" ratings are aggregated 85% of the research sample or 81 out of 95 were in agreement that industrial education teachers should make every attempt to provide their students with precise directions so the individual student can perform the

learning activity and progress at his own learning rate.

Teachers tend to emulate the system by which they were taught. Those who were taught using group instruction where the teacher was the dominant figure have a tendency to teach groups. Those who were taught using individualized instruction where the teacher was the facilitator and the manager of the learning environment and the student was the dominant figure tend to use this method to teach. To determine if those involved in the research preferred one method over the other participants were asked in statement 22:

> Your preference to use conventional group instruction in your laboratory takes precedence over the individualized method.

How participants rated this statement is shown in Table 24.

Table 24

Participant Preference: Group Instruction Versus Individualized Instruction.

N=95

Rating	Frequency	
	Number	Percent
strongly agree	18	18.9
moderately agree	26	27.4
undecided	13	13.7
moderately disagree	21	22.1
strongly disagree	17	17.9
Total	95	100.0

It is evident from data in the table that when the "strongly agree", 18, and the "moderately agree", 26, ratings are aggregated 44 were in agreement with the statement; and when "moderately disagree", 21, and "strongly disagree", 17, were aggregated 38 were in disagreement with the statement. The research sample was almost divided equally on whether or not their preference was for group instruction as opposed to individualized instruction.

A teacher has to have a comfort level when designing or using individualized instruction materials in any classroom setting if the needs of the students are to be met. To collect this kind of data statement 25 was phrased in this

way:

> Individualized instructional materials may not meet your needs as an industrial education teacher.

Ratings given to this statement make up Table 25.

Table 25

Individualized Instruction Materials Meets Needs of Participant

N=95

Rating	Frequency	
	Number	Percent
strongly agree	28	29.5
moderately agree	30	31.6
undecided	10	10.5
moderately disagree	20	21.1
strongly disagree	7	7.4
Total	95	100.1[1]

[1] Total percent is greater than 100 because of rounding.

Data analysis of Table 25 reveal that 58 or (61%) of the 95 participants either "strongly agree" or "moderately agree" that individualized instructional materials may not meet their needs as industrial education teachers. Conversely, 20 or (21.1%) of the 95 teachers indicated that individualized instructional materials were appropriate in meeting their needs as teachers.

The backgrounds that teachers have as individuals varies, therefore not all teachers possess the qualifications required to prepare individualized instructional materials. Statement 26 asked the participating teachers to rate the following statement:

> You may not have the necessary background to write individualized instructional materials.

Table 26 shows data resulting from this statement.

Table 26

Background to Write Individualized Instructional Materials

N=95

Rating	Frequency	
	Number	Percent
strongly agree	11	11.6
moderately agree	30	31.6
undecided	24	25.3
moderately disagree	22	23.2
strongly disagree	8	8.4
Total	95	100.1[1]

[1] Because of rounding the total percent is over 100.

An examination of data in this table show that as a group the 95 teachers who participated in the study by their rating became polarized in disagreement with this statement. Approximately 43% of the 95 participants indicated they were

not qualified to write individualized instructional materials: 32% of the teachers indicated by their disagree rating that they were qualified to write these kind of instructional materials. The 24 undecided portion of the research sample represented 25% of the 95 teachers.

Commercially prepared instructional material is available on the educational market however appropriate instructional material for the concept that a teacher may want to teach is not always easy to locate. The quality and the appropriateness of these materials range from that which is acceptable to that which is totally unacceptable. Materials that are acceptable for one teaching situation may be totally unacceptable for another. It may be that the relevancy of the material to the concept being presented is not always compatible. To find out how the industrial education teachers teaching in the province felt about this issue, participants were asked to rate this statement:

> Commercially prepared instructional material for industrial education may not fit the needs of your program to be of beneficial use.

The ratings given to this statement were used to organize the following table.

Table 27

Commercial Instructional Materials: Needs of Teacher

N=95

Rating	Frequency	
	Number	Percent
strongly agree	5	5.3
moderately agree	22	23.2
undecided	14	14.7
moderately disagree	32	33.7
strongly disagree	22	23.2
Total	95	100.1[1]

[1] Due to rounding the total percent is over 100.

An analysis of data presented in Table 27 show that 32 of the research cohort or 33.7% indicated moderate disagreement with the statement that commercially prepared instructional materials are useful in meeting the needs of their programs. This was the highest single rating given to this statement. Conversely, the aggregate of "strongly agree" and "moderately agree" ratings yielded 28.5% of the teachers indicating that commercially prepared instructional materials, to these teachers, did not meet their program needs.

Budget constraints in a school setting control among other things content presentation through the purchase of

commercially prepared instructional materials. Often these instructional materials are so costly that they are prohibitive for the teacher to purchase. To determine if participants' budgets would permit the purchase of commercially produced instructional material the 28th statement on the research instrument asked:

> The cost of purchasing commercially prepared instructional materials may not be within your budget.

Data collected with this statement can be found in Table 28.

Table 28

Cost of Commercial Instructional Materials: Relationship to Budget

N=95

Rating	Frequency	
	Number	Percent
strongly agree	31	32.6
moderately agree	44	46.3
undecided	12	12.6
moderately disagree	8	8.4
strongly disagree	0	0
Total	95	99.9[1]

[1] Total percent is less than 100 because of rounding.

Forty-four of the 95 teachers gave a rating of

"moderately agree" which was an indication that commercially prepared instructional materials were considered by them to be too expensive for the limited budget they receive and have to work within.

Part A Section II

Section II, Part A of the questionnaire consisted of statements 29 through 42 inclusive. These statements were designed to have participants rate the classroom management technique they employ in their multiple activity laboratory. These statements were prepared to either support or reject the third supporting objective which was:

> To identify the type of print and non-print based instructional materials being used by junior high school industrial education teachers to individualize instruction.

Sub-section 4 included statements 43 through 52 to provide data that would assist the researcher to either accept or reject the fourth supporting objective established for the study:

> To determine the perception that junior high school industrial education teachers in the province hold toward the use of print and non-print instructional materials to facilitate individualized instruction.

Chart III shows the relationship of supporting objectives III and IV to statement numbers on the questionnaire.

Chart III

Relationship of Supporting Objectives III & IV to Questionnaire Statements

Supporting Objective	Statement Number
3	29 - 42
4	43 - 52

There are several unique instructional materials that industrial education teachers might use to present either instructional content, a process, or directions to a student when teaching in a multiple activity laboratory. These materials include both commercially prepared or teacher generated print or non-print instructional material to complement the instruction of the teacher. Among the print materials are instructional sheets, jobs, operation, information and experiment sheets. Articulated Instructional Development Booklets as well as Pictorial Programmed Instruction Texts are a combination of print and non-print material. Non-print instructional material include: slide-tape presentations, filmstrips, slides, transparencies, videotapes, and 8 mm single concept films. Industrial education teachers in Alberta may rely heavily on the use of Articulated Instructional Development (AID) Booklets because they were developed in Alberta by industrial education teachers to provide process specific instructions to

individual students making the project depicted. In order to determine the current extent of teacher use of the AID booklet to individualize instruction participating teachers were requested to rate statement 29 which asked:

> Articulated Instruction Booklets (AID) booklets are the primary instructional material that you use to individualize instruction in your laboratory.

Table 29 shows that data that were collected from the 95 returned questionnaires.

Table 29

AID Booklet: Primary Instructional Material

N=95

Rating	Frequency	
	Number	Percent
strongly agree	2	2.1
moderately agree	13	13.7
undecided	4	4.2
moderately disagree	30	31.6
strongly disagree	45	47.4
missing data	1	1.1
Total	95	100.1[1]

[1] Greater than 100% as a result of rounding.

An analysis of the data presented in this table indicate that 75 (79%) of the 95 responding teachers

indicated disagreement with the statement which meant that these teachers did not use AID booklets as a primary instructional material with their students. Only 15% of participating teachers, an aggregate of those who either strongly agreed or moderately agreed indicated that the AID booklet was their primary method of presenting instruction to students working in their laboratories.

The use of the computer and its technology has witnessed growth in stature as an instructional tool in industrial education. Because of the computers unique capability to provide feedback to the student when given the proper command, teachers are free to assist other students. Computers can be increasingly used to track student progress and to assist the teacher with the management of the laboratory. Teachers may also feel that the use of the computer necessitates having teacher aids or assistants present to help with data entry. To determine if participants were making use of the computer to support their program and to individualize instruction the following statement was written:

> Computer assisted instruction programs and techniques are being used by you in a portion of your program as a means of individualizing instruction to manage students.

The ratings given to this statement by participants were used to assemble Table 30.

Table 30

Computer Technology: Individualized Instruction Student Management

N=95

Rating	Frequency	
	Number	Percent
strongly agree	8	8.4
moderately agree	15	15.8
undecided	10	10.5
moderately disagree	15	15.8
strongly disagree	46	48.4
missing data	1	1.1
Total	95	100.0

It is evident from the data in Table 30 that 46 (48%) of the 95 research participants by rating this statement "strongly disagree" were not using computer technology in their laboratories to assist them with the individualization of instruction or as a means to manage students. These data also show that 23 of the 95 participating teachers endeavoured to make use of computer technology in their laboratories to help them either individualize instruction and manage students.

Students have different learning styles and learn in different ways. These learning styles of the students can be

supported with various teaching aids. Non-print instructional materials often tell more than words can describe to a learner, depending on the learning style of the learner. One teaching aid that can be used as an alternative to written or print material is the 35 mm film strip. The following statement was asked participants if they were using 35 mm film strips to support their instruction:

> Film strips (35 mm), with or without sound, are used as instructional material to individualize instruction to provide course content to students who are learning to work with a tool, material or process in your laboratory.

Table 31 shows data taken from the 95 participants.

Table 31

Use of 35 mm Film Strips: Individualized Instruction

N=95

Rating	Frequency	
	Number	Percent
strongly agree	6	6.3
moderately agree	18	18.9
undecided	1	1.1
moderately disagree	23	24.2
strongly disagree	47	49.5
Total	95	100.0

Data in the above table reveal 70 (73.7%) of the 95

participants through rating of statement 31 either moderately (23) or strongly (47) disagree, which indicated they were not making use of film strips in their laboratories to individualize instruction. Yet 25% of these teachers did make use of film strips as an instructional medium.

Major concepts of instructional content that need to be emphasized can be presented in the form of a transparency which offers the students a visual method of instruction that requires that the student study the content presented to grasp the message intended. Some teachers use transparencies in their classrooms as an instructional material to supplement their instruction. To determine if participants used transparencies as an instructional material in their laboratories the following statement appeared in the questionnaire:

> Transparencies are used in your laboratory as instructional material to instruct students who are working on learning activities.

Data pertinent to this statement are presented in the following table.

Table 32

Transparencies Used as Instructional Material

N=95

Rating	Frequency	
	Number	Percent
strongly agree	15	15.8
moderately agree	25	26.3
undecided	6	6.3
moderately disagree	25	26.3
strongly disagree	24	25.3
Total	95	100.0

An examination of the data in the table above indicate that the rating given to this statement was a near even split between the 95 participating whether or not they used transparencies in their laboratories as an instructional material. Those teachers who indicated agreement were 40 (42.1%) and those teachers who indicated disagreement were 49 (51.6%) with 6 (6.3%) "undecided".

Industrial education teachers may present content to the learner through the use of several instructional sheets grouped into a learning activity package (LAP). A learning activity package is a compilation of predominantly printed materials, which is a form of verbal communication between the student and the teacher, that contains specific

instructions for student activities that lead the student toward a specified performance outcome. In order to find out to what extent learning activity packages were being used by Alberta industrial education teachers, this statement was presented to them on the research instrument:

> Learning activity packages (LAP) are used as instructional material to individualize instruction and to instruct students working in the laboratory.

How the 95 teachers rated this statement are data presented in Table 33.

Table 33

LAP as Instructional Material to Individualize Instruction

N=95

Rating	Frequency	
	Number	Percent
strongly agree	23	24.2
moderately agree	29	30.5
undecided	8	8.4
moderately disagree	17	17.9
strongly disagree	18	18.9
Total	95	99.9[1]

[1] Total percent less than 100 as a result of rounding.

It is evident from data in Table 33 that 52 (55%) of the 95 teachers involved in the research, by their rating either

"strongly agree" or "moderately agree" indicated that they made use of learning activity packages as a means of instructing students working on learning activities in the laboratory. Conversely, 35 (37%) of the 95 participants through their rating indicated that they did not make use of learning activity packages as instructional material with their students.

An instructional material that is unique to industrial education and is applicable to the individualization of instruction is Pictorial Programmed Instruction (PPI) texts. A PPI is described as a series of precise descriptive statements with supporting photographs arranged in sequential programmed order to describe a process or operation a student is to perform. In order to find out if industrial education teachers were using PPI's as an instructional material in their laboratories they were asked to rate this statement:

> Pictorial Programmed Instruction Texts (PPI's) are used by you as instructional material to assist with instructing students as they work in the multiple activity laboratory where you teach.

Teacher ratings from this statement make up Table 34.

Table 34

PPI: Used With Student Instruction

N=95

Rating	Frequency	
	Number	Percent
strongly agree	11	11.6
moderately agree	31	32.6
undecided	4	4.2
moderately disagree	22	23.2
strongly disagree	27	28.4
Total	95	100.0

Data analysis of Table 34 show that 42 of 95 responding teachers made use of the PPI's as an instructional material with their junior high school industrial education students: and 49 of these 95 teachers who rated this statement "moderately disagree" and "strongly disagree" indicated that they did not make use of the PPI as an instructional material with their students. Only 4% of the population remained "undecided" on this issue.

Industrial education teachers may also prepare printed instructional sheets that give students directions while they are working in the laboratory on individual or group activities or projects. These instructional sheets may be specific to a process or may be presented in problem form for

the student to solve. The degree to which industrial education teachers make use of this method of providing instruction to their students was written into the following statement:

> Written instructional sheets, operation or job sheets, which consist of sequential step by step written instructions, are predominately used to provide instruction in your laboratory.

Results of the 95 responding teacher ratings are presented in Table 35.

Table 35

Instructional Sheets: Predominant Method of Instruction

N=95

Rating	Frequency	
	Number	Percent
strongly agree	29	30.5
moderately agree	49	51.6
undecided	5	5.3
moderately disagree	7	7.4
strongly disagree	5	5.3
Total	95	100.1[1]

[1] Rounding results in a percent greater than 100.

Data represented in Table 35 show that 78 (82%) of the 95 teachers involved in the study indicated agreement by their rating of either "strongly agree" or "moderately agree"

that written instructional sheets were used by them as a primary method of providing instruction to students in their laboratories. Only 12% of the research sample indicated some degree of "disagreement" to the use of written instructional sheets as the primary method of instruction.

In industry instructions are often conveyed verbally by supervisors to a subordinate. In industrial education there may be a parallel. It is often easier and less time consuming for the teacher to tell a student what "to do" rather than take time to write instructions on paper or to prepare graphic illustrations to support the content to be taught. In a multiple activity laboratory verbal instructions to a learner may not be always feasible, because of the number of activities being taught concurrently. To determine if verbal instructions were the major method of providing instructions to students statement 36 asked participants:

> Verbal instruction given to students by you is the main method of delivery used by you to provide directions or instructions to students as they work in the laboratory.

Data collected with this statement can be found in Table 36.

Table 36

Usage of Verbal Instruction: Main Delivery Method

N=95

Rating	Frequency	
	Number	Percent
strongly agree	30	31.6
moderately agree	45	47.4
undecided	6	6.3
moderately disagree	10	10.5
strongly disagree	4	4.2
Total	95	100.0

It is evident from data in the above table that the ratings given this statement were more closely related to each other than ratings given to previous statements. Seventy-five, 79% of the 95 research cohort rated this statement as being strongly in agreement and moderately in agreement. This was an indication that oral instruction was the main teaching method used by these teachers to present instructional content to students in their laboratories.

Authors of textbooks like to use photographs to support textual material. For instance a picture depicting internal moving parts of an engine is more descriptive than a verbal explanation of how these parts function. Teachers of special subjects such as industrial education often use flip charts

to illustrate a concept that is difficult for the student to grasp. These teachers use these charts because they can be repetitively used, they can be easily prepared and are relatively cheap to produce. To determine if participants used flip charts with their students this statement was included on the research instrument:

> Graphic flip charts are used by you to assist in the instruction of students in your laboratory.

Data collected with this statement comprise Table 37.

Table 37

Use of Flip Charts to Assist with Instruction

N=95

Rating	Frequency	
	Number	Percent
strongly agree	5	5.3
moderately agree	13	13.7
undecided	9	9.5
moderately disagree	22	23.2
strongly disagree	46	48.4
Total	95	100.1[1]

[1] Greater than 100% because of rounding.

An analysis of data from the above table indicate that of the 95 participating teachers 68 or 71.6% did not use flip charts as an aid in assisting them with the instruction of

their students. At the other end of the continuum 19% of the 95 teachers did make use of flip charts as an aid when instructing students.

Computers are prevalent in the schools of Alberta where they are being increasingly used for a wide range of applications. In some school jurisdictions industrial education teachers have modified or expanded their programs to make wider use of the computer to assist them to present instructional content to their students. Below is the statement on the use of computers participants were asked to rate:

> Computer programs are being used by you to assist with the instruction of students as they work in the laboratory.

Ratings given to this statement can be found as data in Table 38.

Table 38

Computer Programs: Instructional Delivery

N=95

Rating	Frequency	
	Number	Percent
strongly agree	6	6.3
moderately agree	25	26.3
undecided	5	5.3
moderately disagree	20	21.1
strongly disagree	39	41.1
Total	95	100.1[1]

[1] Total percent is greater than 100% because of rounding.

From these data it is evident that 59 of the 95 responding teachers or 62.6% did not make use of the computer or computer programs to assist them with the instruction of their students. At the time of the research, 32.6% of the research population did use computer programs as a means of presenting students with course content.

Thirty-five millimetre slides are a non-print medium that can be used to convey an idea, show the sequence of a procedure used to set up a machine or to perform a process or to provide instruction to students. In order to determine if slides were being used as an alternate method of delivering instruction, participants were asked to rate this statement:

Slides are used as instructional material to present learning activities to the students in your laboratory.

In Table 39 are data which illustrate the rating the 95 members of the research population gave this statement.

Table 39

Use of Slides as Instructional Material

N=95

Rating	Frequency	
	Number	Percent
strongly agree	9	9.5
moderately agree	21	22.1
undecided	3	3.2
moderately disagree	19	20.0
strongly disagree	43	45.3
Total	95	100.1[1]

[1] Greater than 100% because of rounding.

An analysis of the data in Table 39 show that 65.3% of the 95 respondents rated this statement either "moderately disagree" or "strongly disagree" thus indicating they were not using slides to supplement instructional activities with their students. However 30 of those involved in the research did make use of this medium of instruction.

Audio tapes are another form of non-print instructional material that can be used to provide instruction to

industrial education students. In support of the third supporting objective for the study, participants were asked to rate this statement:

> Audio tapes are used to provide instruction to students as they work independently in your laboratory.

Table 40 shows data collected with this statement.

Table 40

Use of Audio Tapes to Provide Instruction

N=95

Rating	Frequency	
	Number	Percent
strongly agree	6	6.3
moderately agree	16	16.8
undecided	2	2.1
moderately disagree	19	20.0
strongly disagree	52	54.7
Total	95	99.9[1]

[1] Total percent is less than 100 because of rounding.

Data in Table 40 indicate that three quarters of the research sample rated this statement either "strongly disagree", 52, or "moderately disagree", 19. From these ratings the conclusion could be made that these teachers do not use audio tapes as an instructional medium. A total of 22 teachers did make use of audio tapes with their students.

Another method of presenting content is through the use of either commercial or teacher prepared videotapes. Videotapes, because of their capacity to present colour, sound and action, present instructional material that is more realistic than an audiotape. The student's attention becomes more fixed when video and audio are combined into a single medium. Recent technological advancements in development of the video camera enables teachers to create videos showing processes, equipment set up, or safety precautions to be followed. The videotape can be viewed by the students whenever this information is needed. To what extent are teachers making use of videotapes to present instruction to their students? In order to answer this question participants were asked to rate the following statement:

> Videotapes are used by you to provide instructional material to students while they individually work in your laboratory.

Table 41 was organized using data obtained with this statement.

Table 41

Use of Videotapes as an Instructional Medium

N=95

Rating	Frequency	
	Number	Percent
strongly agree	16	16.8
moderately agree	40	42.1
undecided	8	8.4
moderately disagree	15	15.8
strongly disagree	16	16.8
Total	95	99.9[1]

[1] Total is less than 100% because of rounding.

An analysis of the data in Table 41 reveal that 56 as opposed to 31 of the 95 participants confirmed by their rating that they were using videotapes as an instructional medium with learners in their laboratories.

No single instructional material used to present instruction to a learner works well independently, but when print and non-print materials are combined, teaching may become more successful. To determine if industrial education teachers combined instructional materials to meet the learning needs of their students, they were asked:

> Combinations of instructional materials are being used by you because they work best in your laboratory to help meet the individual learning needs of the student.

Data from the 95 returned questionnaires are compiled in Table 42.

Table 42

Combining Instructional Materials to Meet the Needs of Students

N=95

Rating	Frequency	
	Number	Percent
strongly agree	46	48.4
moderately agree	35	36.8
undecided	9	9.5
moderately disagree	4	4.2
strongly disagree	1	1.1
Total	95	100.0

An examination of data in Table 42 show that of the 95 respondents 81 (85.2%) indicated by their ratings of "strongly" and "moderately agree" that they were in "agreement" with the statement. This meant that these teachers were using a combination of print and non-print instructional materials to help students meet their needs as learners.

As previously discussed, sub-section 4 for data analysis was made up of statements 43 through 52. For these 10 statements participants continued to rate each statement

using the five point Likert scale.

The quality of an instructional material contributes to user appeal which often results in whether or not a teacher continues using this material in the classroom. Information pertinent to teacher's opinions on the quality of instructional material was required for this study, therefore the participants were asked to react to this statement:

> The quality of teacher prepared instructional materials is inferior to those instructional materials that are commercially prepared.

Data in Table 43 represent that collected with the above statement.

Table 43

Quality of Instructional Materials: Teacher or Commercially Prepared

N=95

Rating	Frequency	
	Number	Percent
strongly agree	9	9.5
moderately agree	10	10.5
undecided	12	12.6
moderately disagree	34	35.8
strongly disagree	30	31.6
Total	95	100.0

By examining data in Table 43 it is evident that, out of

the 95 teachers involved in the study 64 selected either "strongly" or "moderately disagree" as a rating to this statement. This indicated that these teachers felt that teacher prepared instructional materials were of better quality than those commercially prepared to meet to their needs as teachers. Twenty percent of the participants by their rating did agree that commercially prepared instructional materials were of better quality than those materials that were teacher prepared.

Print instructional materials appear to be predominately used over other instructional materials. Various reasons are cited by teachers for their preference of print materials over other forms of instructional materials. Some of these reasons are; cost, time available for design and production of these materials, the availability of support personnel, and the ease of reproduction. To determine the extent of use of print instructional materials among the research sample, participants were asked to respond to this statement:

> Print instructional materials are predominantly used because they are versatile and low in cost.

Data from this statement make up Table 44.

Table 44

Predominant Use of Print Instructional Material

N=95

Rating	Frequency	
	Number	Percent
strongly agree	24	25.3
moderately agree	44	46.3
undecided	13	13.7
moderately disagree	8	8.4
strongly disagree	6	6.3
Total	95	100.0

It is evident from data in this table that 72% of the research sample who selected "strongly agree", 24, or "moderately agree", 44, indicated that print instructional materials were predominately used by them because of the versatility and low cost of these materials.

Many junior high students because of their learning style may not like to read instructions that consist of printed matter. Some students find it easier to ask the instructor to "show me how" rather than to "read and follow instructions" that are written on paper. To determine if instructions using print appealed to the learning style of the students, participants were asked:

Print instructional materials when presented

alone do not appeal to the individual learning styles of the student.

Data from the above statement were used to assemble the following table.

Table 45

Appeal of Print Instructional Materials

N=95

Rating	Frequency	
	Number	Percent
strongly agree	20	21.1
moderately agree	39	41.1
undecided	15	15.8
moderately disagree	19	20.0
strongly disagree	2	2.1
Total	95	100.1[1]

[1] Total percent is greater than 100 because of rounding.

It is evident from the data in Table 45 that when the ratings of "strongly agree" or "moderately agree" are aggregated 59 of the 95 teachers agree print materials, when presented in isolation do not appeal to individual learning styles of the learner. Twenty-one of 95 participants strongly or moderately disagreed that print instructions lacked student appeal and 15 teachers remained "undecided" on this issue.

Authors of industrial education texts prefer to use graphics or photographs to supplement content of the text in presenting either a process or a project. Students prefer looking at a graphic or a photograph because these materials may be more descriptive, entertaining and appealing than printed text. There are other forms of non-print instructional material that possess the same characteristics and which appeal to the learner. The following statement was asked of participants:

> Non print materials (i.e., filmstrips, slides, and 16 mm films) appeal to students as learning devices because of the graphics used to present the intended content.

Data resulting from the above statement are summarized in Table 46.

Table 46

Graphics Appeal to Student Learning Styles

N=95

Rating	Frequency	
	Number	Percent
strongly agree	21	22.1
moderately agree	48	50.5
undecided	23	24.2
moderately disagree	3	3.2
strongly disagree	0	0
Total	95	100.0

An examination of the data compiled in Table 46 reveal that 69, nearly 73% of the research sample agreed that graphics in films, filmstrips and slides as learning devices appeal to students.

Locating professionally prepared non-print instructional materials that is content specific that meets the needs of the teachers and students is often difficult to do. Those involved in the research were asked to rate this statement:

> Commercially prepared content specific,non-print instructional materials such as slides, filmstrips, and films are often difficult to locate.

Data for the above statement obtained from the returned questionnaires are documented in Table 47.

Table 47

Availability of Commercially Prepared Non-print Instructional Material

N=95

Rating	Frequency	
	Number	Percent
strongly agree	33	34.7
moderately agree	47	49.5
undecided	7	7.4
moderately disagree	6	6.3
strongly disagree	2	2.1
Total	95	100.0

From an analysis of data in this table it is evident that 80 of the 95 teachers involved in the research by rating this statement "strongly" or "moderately agree" indicated it was difficult for them to locate commercially prepared instructional material that was content specific.

The cost of purchasing commercially prepared non-print instructional materials can be prohibitive to most school budgets. To determine if this was applicable to research participants they were asked:

> Purchasing commercially prepared non print materials are often beyond the budget limitations granted to you by the administration.

Results from the returned questionnaire responses were

used to prepare Table 48.

Table 48

Cost of Non-print Instructional Materials: Budget Limitations

N=95

Rating	Frequency	
	Number	Percent
strongly agree	50	52.6
moderately agree	31	32.6
undecided	13	13.7
moderately disagree	1	1.1
strongly disagree	0	0
Total	95	100.0

Data in this table reveal that slightly more than 85% of the respondents who rated this statement either "strongly agree" or "moderately agree" took the position that commercially prepared non-print instructional materials were too expensive for the limited budgets provided to industrial education departments by school administrators.

Teachers who prepared their own instructional materials prepared content specific materials that meet either program or teacher needs. A print instructional material that has been meeting program requirements with preservice teachers at the University of Alberta that satisfy the needs of both the

instructor and the student was Pictorial Programmed Instruction. Pictorial Programmed Instruction texts are a unique way teachers can present both visual and print instructions to students simultaneously. In order to determine if teachers were using PPI participants were asked:

> Teacher prepared Pictorial Programmed Instruction Texts are content specific and facilitate your needs in individualizing instruction in your laboratory.

Data from the above statement is shown in Table 49.

Table 49

Use of Pictorial Programmed Instruction Texts

N=95

Rating	Frequency	
	Number	Percent
strongly agree	20	21.1
moderately agree	34	35.8
undecided	22	23.2
moderately disagree	9	9.5
strongly disagree	9	9.5
missing data	1	1.1
Total	95	100.2[1]

[1] Rounding results in a total percent greater than 100.

Data analyzed from Table 49 show that of the 95 respondents 54 or 56.9% from their rating of either

"strongly" or "moderately agree" indicated they used Pictorial Programmed Instruction texts to meet the needs of their students in their laboratories. There were 23% of the population who gave an "undecided" rating to this statement which indicated that these teachers did not use Pictorial Programmed Instruction Text as an instructional material. One teacher did not rate this statement.

In some cases industrial education teachers combine a number of print instructional material supplemented by non-print instructional material into a learning activity package. Print material may include job sheets, operation sheets, information sheets, or experiment sheets. To add to the effectiveness of these sheets a graphic may be included to help the student understand the concept that is presented. To determine if graphics are integrated into the learning activity packages by those involved in the study this statement was presented:

> If learning activity packages (LAP), are used in your laboratory, these LAPs contain pictures as well as script.

Data yielded with statement 50 on the returned questionnaires are presented in the following table.

Table 50

Integration of Graphics into Learning Activity Packages

N=95

Rating	Frequency	
	Number	Percent
strongly agree	19	20.0
moderately agree	34	35.8
undecided	19	20.0
moderately disagree	12	12.6
strongly disagree	10	10.5
missing data	1	1.1
Total	95	100.0

An examination of the results tabulated in Table 50 reveal that 53 of the 95 respondents or 55.8% of the research population by selecting "strongly agree" or "moderately agree" as a rating indicated that the Learning Activity Packages (LAP) they used did contain graphics, 20% of the respondents remained "undecided", and the remaining 23% of the teachers did not use LAPs that contained graphics. One teacher failed to respond to this statement.

Technological advancements in the video industry have enabled educators to utilize videotapes as a means of presenting instructional content to the learner. Industrial

education teachers might use a video tape as a means to supplement their teaching. A videocassette recording of an operation, an industrial process, or the safe operation of a machine might be presented. To determine if members of the research cohort were making use of this technology in their laboratories they were asked to rate the following statement:

> Videocassettes are used by you to provide instructional material to students while they are working in your laboratory.

In table 51 are data from the above statement.

Table 51

Videocassettes Used as an Instructional Material

N=95

Rating	Frequency	
	Number	Percent
strongly agree	14	14.7
moderately agree	28	29.5
undecided	9	9.5
moderately disagree	20	21.1
strongly disagree	23	24.2
missing data	1	1.1
Total	95	100.1[1]

[1] Rounding results in a percent greater than 100.

Participant responses to this statement were divided evenly. When the ratings of "moderately disagree" or

"strongly disagree" are aggregated of the 95 participants 43 or 45% indicated that they do not use videocassettes to instruct students in their laboratories. Conversely 42 of the 95 teachers who rated the statement "strongly agree" or "moderately agree" indicated that they used videocassettes to instruct students they taught.

Articulated Instruction Development (AID) booklets are another form of print material used to present instruction to students working in a multiple activity laboratory. These show and tell booklets illustrate the procedures a student is to follow in making a specific project. In the past these booklets were used extensively in many industrial education laboratories throughout the province. Are industrial education teachers at the junior high school level presently using the AID booklet to supplement their teaching in their laboratories? To collect this type of information participants were asked to rate this statement:

> AID booklets are used by you to provide instructional material to students while they are working in your laboratory.

Data collected with this statement were used to organize the following table.

Table 52

AID Booklets: Used as Instructional Material

N=95

Rating	Frequency	
	Number	Percent
strongly agree	3	3.2
moderately agree	27	28.4
undecided	8	8.4
moderately disagree	30	31.6
strongly disagree	27	28.4
Total	95	100.0

An examination of the data in Table 52 show that a total 57 (60%) of the 95 involved in the study did not use the AID booklets to supplement their instruction with students working in their industrial education laboratories. Conversely only 30% of the research population did use the AID booklet as an instructional material.

Analysis Part B

Demographic Teacher Data

This section of the instrument was designed to collect information about industrial education teachers so that a profile could be developed for the sample that were involved in the study. To collect data to form that profile, statements 53 through 60 were included in the research

instrument. Data collected with these statements are analyzed in this section of the report.

Sometimes industrial education teachers are assigned by a school administrator to teach several grades of industrial education students in a junior high school setting. This teaching assignment may vary from school to school jurisdiction and can be based on such factors as the size of the school, the student population of the school, location of the school, i.e., rural or urban, and teacher competencies in other subjects. In order to determine the grade level of industrial education each participating teacher was teaching at the time of the study, they were asked this question:

Your industrial education teaching assignment is?

a) grade 7,8,9 level
b) Industrial Education 10-20-30[1]
c) split 7,8,9 and Industrial Education 10-20-30

The answers participants gave to this question are data that are summarized in Table 53.

[1]It should be noted that the alpha-numerical numbering system for curricula used by the Curriculum Design Branch, Alberta Education, courses numbered "10" are those offered at the grade 10 level; "20" at the grade 11 level; "30" are for courses that are available at the grade 12 level.

Table 53

Industrial Education Teaching Assignment: Participant

N=95

Teaching Assignment	Frequency	
	Number	Percent
grade 7,8,9 level	55	57.9
Ind. Ed. 10-20-30	8	8.4
split 7,8,9 and Ind. Ed. 10-20-30	32	33.7
Total	95	100.0

Data in table 53 indicate that of the 95 responding teachers, 58% were assigned to teach industrial education at the junior high school level; 34% had their teaching assignments split between junior high and high school industrial education classes. The remaining 8% indicated they were high school industrial education teachers.

Teacher assignments also vary in the percentage of time that industrial education teachers are assigned to teach this subject area. Schools with a small student population require teachers to teach additional subjects to justify a teaching position. To determine the amount of time a participant's teaching assignment was devoted to teaching industrial education the participants were asked:

> What percentage of your total teaching duties is devoted to teaching industrial education?

a) 80 - 100%
b) 60 - 79%
c) 40 - 59%
d) less than 39%

In table 54 are data which summarize the results that were provided by those involved in the research.

Table 54

Percent of Teaching Assignment Allocated to Industrial Education

N=95

Teaching Assignment Percent	Frequency	
	Number	Percent
80 - 100%	64	67.4
60 - 79%	18	18.9
40 - 59%	10	10.5
less than 39%	3	3.2
Total	95	100.0

An examination of data in Table 54 show the percent of time that the cohort of 95 teachers were assigned to teach industrial education. Sixty-four of these teachers spent at least 80% of their time teaching industrial education; 18 taught this subject area for at least 60% of their teaching assignment; and 13 taught this special subject less than 59% of their teaching assignment.

To determine the amount of teaching experience

participants had they were asked:

> Please indicate the number of years you have taught industrial arts (industrial education) in the schools of the province.
>
> 1 2 3 4 5 6 7 8 9 10 12 14 16 18 20 or more.

Data collected with this statement are represented in Table 55.

Table 55

Years of Teaching Experience: Participants

N=95

Years: Teaching Experience	Frequency	
	Number	Percent
2	5	5.3
3	1	1.1
4	4	4.2
5	6	6.3
6	4	4.2
7	2	2.1
8	4	4.2
9	2	2.1
10	5	5.3
12	8	8.4
14	7	7.4
16	12	12.6
18	8	8.4
20	25	26.3
or more	1	1.1
missing data	1	1.1
Total	95	100.1[1]

[1] Total percent greater than 100 as a result of rounding.

Data in this table show the professional maturity of

those industrial education teachers involved in the research. Twenty-six of these teachers had 20 or more years experience teaching industrial education. This group of teachers represented one quarter of those involved in the study. Of the 95 teachers who comprised the research sample 41 had between two and 12 years experience teaching industrial education in the province. One participant failed to provide the information that was requested. There were no first year teachers involved in the study.

Human Resource personnel of the various school jurisdictions in the province recruit industrial education teachers wherever they can. The preservice preparation program of these teachers can vary from a university industrial education program of study to a vocational education program of study. To determine the type of educational program participants received as undergraduate students they were asked:

> Identify the teacher education program which prepared you to teach industrial education.
>
> a) industrial arts (industrial education)
> b) vocational education
> c) other

Table 56 show the preservice program that prepared participants to teach industrial education.

Table 56

Teacher Preparation Program of Participants

N=95

Preparation Program	Frequency	
	Number	Percent
Industrial Arts (Ind. Ed)	80	84.2
Vocational Education	7	7.4
Other	8	8.4
Total	95	100.0

It is evident from the data shown in the above table that the majority, 80 out of 95 or 84.2% of the research sample completed an industrial arts program of study at a post-secondary institution; 7% from the group completed a vocational education program of study; and 8% indicated they completed a program "other" than either industrial arts or vocational education.

Industrial education teachers can receive their preservice preparation at a number of post secondary institutions in North America. The type of preparation these teachers receive will greatly influence the type of industrial education program they offer their students. To identify where those involved in the study received their preparation statement 5 asked:

5. Please identify the institution

responsible for your teacher preparation.

a) University of Alberta
b) Other Canadian Institution
c) Non-Canadian Institution

Data collected with this question were used to organize the following table.

Table 57

Teacher Preparation Institution: Participant

N=95

Institution	Frequency	
	Number	Percent
University of Alberta	61	64.2
Other Canadian Institutions	12	12.6
Non Canadian Institutions	22	23.2
Total	95	100.0

It is evident from the data in the above table that approximately two thirds of the cohort or 61/95, 64% received their preparation to teach at the University of Alberta; 12.6% were prepared by other Canadian institutions and the remaining 23.2% received their education at Non Canadian Institutions.

Teaching industrial education in a multiple activity laboratory can be challenging, demanding as well as stressful to the teacher because of the special management and

organizational skills required to be successful. Many of these skills are taught in the preservice program of study. To determine if participants acquired these skills prior to entering the profession they were asked to respond to a two part question. The first part of the question asked:

> 6. Did you have any formal preparation that would permit you to manage a multiple activity learning environment, like that used in teaching the Alberta Industrial Education Program?
>
> a) yes
> b) no

The second part of the question asked:

> If yes where did you receive that preparation?

Tabulated data from the 95 participants for the above statement appear in Table 58.

Table 58

Formal Preparation to Manage a Multiple Activity

N=95

Preparation Received	Frequency	
	Number	Percent
yes	54	56.8
no	40	42.1
missing data	1	1.1
Total	95	100.0

An analysis of the data in Table 58 show that 54 of the

95 teachers answered in the affirmative indicating that in their undergraduate program they had received formal preparation that would permit them to manage a multiple activity laboratory where industrial education is taught. Conversely 42% of respondents responded negatively which indicated that they did not receive preparation in the procedures to manage a multiple activity laboratory. One teacher did not supply the data that was requested. Of the 54 participating teachers that indicated they had received laboratory management training 38 teachers said they received that training at the University of Alberta. The remaining 16 teachers received their training at Universities in the United States (6), The University of Saskatchewan (3), Red River Community College in Winnepeg (1), Calgary Board of Education - inservice program (3) and The Industrial Education Specialists Council of the Alberta Teachers Association - through workshops (3).

The mainstreaming of handicapped students into regular school classes has resulted in the integration of students with special needs into the general population of the school including industrial education. The management of a multiple activity laboratory where handicapped students are integrated with regular students makes teaching more complicated and stressful for all concerned. A two part question was designed to determine if students with special needs were integrated into classes of the participants. To collect that

kind of data those involved in the research were asked:

7. Have handicapped students been integrated into your classes?

a) yes
b) no

If "yes" please identify the handicap.

physically dysfunctional[1] _____
psychosocially dysfunctional[2] _____

Results of teacher responses to statement 59 are data summarized in the table below.

Table 59

Integration of Handicapped Students: Participants Classrooms

N=95

Handicapped Students Integrated	Frequency	
	Number	Percent
yes	83	87.4
no	11	11.6
missing data	1	1.0
Total	95	100.0

[1] For the purpose of the investigation, physical dysfunction is defined as the impairment of any part of the body which limits normal activities required for daily living.

[2] Psychosocially dysfunctional is defined as the impairment of the mental processes of the learner in interactions with other individuals.

Taken from: Preitz, C. H. (1969). Goals and Basic Units of Instruction for Treatment Media Courses For The Preparation of Occupational Therapists.

Table 59 show data which indicate that 83 of the 95 teachers involved in the research by their affirmative answer did have handicapped students integrated with other students in their laboratories; 11 of these 95 teachers indicated by a negative response they did not have handicapped students in their industrial education classes.

For the purpose of this study participants who responded "yes" were asked to identify the handicap of the student as either physically dysfunctional or psychosocially dysfunctional.

How the "yes" participants classified their handicapped students can be found in Table 60.

Table 60

Participant Classification of Student Handicap

N=95

Handicap Classification	Frequency	
	Number	Percent
physically dysfunctional	20	21.0
psychosocially dysfunctional	21	22.1
other	40	42.1
neither	10	10.5
missing data	3	3.3
Total	95	99.0[1]

[1] Rounding results in percent less than 100.

An analysis of the data shown in Table 60 indicate 40/95 or 42% of 95 responding teachers have had other than physically and psychosocially dysfunctional students integrated with other students in the industrial education classes they taught. Conversely approximately 21 of the 95 teachers had students who were psychosocially dysfunctional mainstreamed into their industrial education classes. Twenty of those involved in the study had students with some type of physical dysfunction integrated with other students they taught. Three participants did not provide data to this question.

Chapter IV

Interpretation Of Data

The preceding chapter consisted predominantly of data analysis for each statement on the research instrument. The content of this chapter will interpret these data to determine if the problem statement for the research as well as the four supporting objectives were accepted or rejected. From the demographic data that were collected a profile will be developed for the average industrial education teacher who was involved in the research.

Supporting Objective I

Authorities who have written on classroom management are in agreement that management is a function that organizes people and resources that is necessary to achieve established goals in an educational setting. The elements that a teacher can manage according to Johnson and Brooks (1979) include: time, space, personnel, material, and authority which these authors sub-divide into responsibility, reward, and punishment. In essence teachers are managers of both people and instruction.

The management element of space is an important function for a junior high school industrial education teacher to control and to allocate to a field of study when managing a multiple activity laboratory to individualize instruction. These data can be found in Tables 1 and 2.

Those involved in the research from the data they provided would agree that there is a relationship between the time it takes a learner to complete a learning task and the learning style of the learner. This relationship of task to learning style will vary with the difficulty of the material to be learned. Table 3 contains these data. Closely related to the learning style of the student is the method of delivering instruction which can be small group instruction, larger group instruction, or individualized instruction. The majority of the research cohort agreed that when a teacher uses individualized instruction they have more time to devote to the slow learner. See Table 4 for supporting data.

Student progression through the various areas of a multiple activity laboratory can be stressful to the teacher and the students because the students may be at different stages of completing a learning activity and may not be ready to advance to the next area to become involved with an unfamiliar learning activity. This places added pressure on both the students and the teacher. Those involved in the study substantiate this by data presented in Table 5.

Data in Table 6 was interpreted to mean that it was easier for the teacher to manage the rotation of students through modules when instruction was individualized. It should be noted from these data that not all teachers supported the use of individualized instruction as a teaching strategy.

It is evident from data in Table 7 that participants were of the opinion that the problems they had with equipment usage, breakdown, and repair intensified when a rigid time frame was employed for the student to complete a learning activity. The rigidity of time also created problems with materials management for some of these teachers.

Data from Table 8 show that the ratings of agree and disagree were not that far apart 41 to 36. This was interpreted to mean that equipment repair costs were hardly affected by the methods used to deliver instruction to students working in different areas of the laboratory.

From the analysis of data in Table 9 it is evident that the increased use of individualized instruction was a means that the teacher could use to manage the content to be presented. Approximately one fourth of the research sample did not support this concept because they were undecided if course content was controllable using individualized instruction.

Because of the organization of the multiple activity laboratory into areas and the variety of learning activities that are available to the students in each area, the learning needs of students with varying abilities can be met. This statement is based on data interpreted from Table 10.

From the interpretation of the data presented, the first supporting objective was accepted because it was found that individualized instruction does complement the management

elements of time, content, space, student progression, rotation of students through the various areas, as well as equipment and materials management. The only element that the teacher had no control over was the learning style of the learner.

Supporting Objective II

A major problem that a teacher may face, when they attempt to organize their laboratory for the first time, is the bias they may have acquired under the system which they were prepared. An interpretation of data from Table 11, page 92 gives support to this statement.

Over half of the teachers involved in the study were comfortable with the status quo and were reticent to experiment with different methods to organize to present instructional content to the learner other than the methods they were taught. As a result the use and expansion of individualized instruction was retarded. This statement has its foundation from data in Table 12.

Approximately three quarters of the research sample, as indicated in Table 13, were of the opinion that the individualization of instruction could be used as a strategy to present instructional content to junior high school students who were enroled in industrial education at the grade 7, 8, and 9 levels.

Although some of the teachers, 19, would like to individualize their course they were cognizant of the fact

that this strategy is time intensive on the part of the teacher. It is the teacher who must use any available free time to design the instructional material and follow it through the process to implementation. Data to support this interpretation can be found in Table 14. There are data in the fifteenth table which indicate this problem could be surmounted if teachers were provided with release time to prepare these materials.

Participants of the research were divided on the issue whether or not individualized instruction would hinder their decision to adopt learner centred instruction or whether they should continue to use group instruction that was teacher dominated. See Table 16, page 100, for supporting data.

The majority of those involved in the investigation, 74 of 95 indicated not only would they prepare instructional material to individualize instruction, but they would make greater use of it with their students, providing they had the assistance of support personnel in the preparation of these materials.

There was agreement among the research participants that to augment individualized instruction, well designed charts could be used as a recording device to track student progress through the course.

Not all teachers who provided data were in agreement that junior high school students who they taught had the ability to read and comprehend directions that were written

in simple, concise terms. These teachers were of the opinion that through the use of individualized instruction these student would still have the opportunity to work as a member of a group where they could socialize. See Tables 19 and 20, pages 104 and 106.

The teachers who furnished data for the study were undecided if there was a relationship between the use of individualized instruction and the waste of materials in an industrial education laboratory. These teachers were of the opinion that equipment breakdowns were easier for them to manage when the equipment was used by a single student as opposed to a group of students. Tables 21 and 22 give support to this interpretation.

The results of the research show that industrial education teachers should make every effort to provide the junior high school students they teach with both verbal and written instructions that are precise. These directions should be given or written at the educational level of the learner that would permit the learner to progress at a pace determined by the learner. Some teachers were unable to decide whether or not they had a preference of using group instruction or individualized instruction with their students. They were also not sure that individualized instructional materials would meet their needs as industrial education teachers. Whether or not these teachers had the necessary competencies to design, write, and revise these

instructional materials remained undecided. Among the members of the research sample there were some who took the position that commercially prepared instructional materials did not meet the needs of their program. Other members took the opposite position. Supporting data for information presented in this paragraph can be found in the following Tables: 23, 24, 25, 26, 27, and 28.

The researcher accepts the second supporting objective because the interpretation of the research data show that the major problems that a junior high school industrial education teacher might encounter as they attempt to individualize their instruction were identified. Among these problems were: release time for the teacher to design, to prepare and to implement the instructional materials that are designed; lack of support personnel to assist with instructional material design; verbal and written instruction provided to a student should be clear and concise; teachers have a bias to want to replicate the environment in which they were taught; teachers were unable to determine whether or not individualized instruction should be used as a teaching strategy; teachers were unsure that individualized instruction would meet the needs of their students.

Supporting Objective III

Teachers teaching multiple activity industrial education in Alberta must design, implement or provide instructional material that the students can and will use as they work in

a laboratory. The method used to present content and instruction to students simultaneously working at different activities, is a problem each teacher must cope with.

Part A Section II of the questionnaire contained statements 29 through 42 which listed the types of print and non-print based instructional materials that could be used by teachers to individualize instruction in their industrial education laboratories. Participating teacher reactions to these statements identified the teacher preferred methods of presenting instruction to their students.

Teachers participating in the research were asked to rate their use of non-print, composite print/non-print, verbal and print instructional materials. From the data obtained the researcher was able to determine the preferred method of instruction being used by the participating teachers.

Non-print instructional materials, that teachers feel are appropriate, are hard to locate, expensive to buy and difficult for the teacher to make. These same instructional materials may be preferred by the student as a learning method. For this reason, approximately 60% of the responding teachers indicated they made little use of non-print instructional materials to supplement either their instruction or to individualize instruction with students while they work in the laboratory. Data presented in Tables 31, 32, 37, 39 and 41 substantiate this interpretation.

Approximately 55% of the participating teachers indicated that composite print/non-print instructional materials met their needs to individualize instruction and present content to their students. Teachers prefer to use print and pictures in combination when designing and producing instructional materials because of the relatively low cost of production, ease of adaptation to program content, and the ease with which teachers can produce these instructional materials. Pictures are more descriptive than typed text and are preferred by students as a method of conveying a message. Not all participating teachers took this position as nearly 35% indicated they did not use composite instructional materials. In Tables 29, 33, 34 and 42 are data that support this interpretation.

Oral instruction supplemented with "show me" demonstrations is the easiest method for the teacher to communicate with a student on a one to one basis and is the method often preferred by both parties in a teaching situation. Several reasons are; that this method is very versatile for the teacher, it requires less effort on the part of the student, and it is the easiest instructional method for the teacher to edit. Results of teacher ratings to statements pertinent to voice or sound communication are contained in Tables 36 and 40. Participating teachers preferred person to person verbal instruction but they did not have a preference to use audio-tapes when they were

teaching students individually in the laboratory.

Predominantly print based instructional material has traditionally held a strong preference among those involved in the process of teaching. Research results supported by data in Tables 30, 35 and 38 indicate that the participating teachers were divided on the issue of their use of these instructional materials with their students. Using printed text primarily to communicate instruction to students can be difficult for the teacher to prepare and accurately describe the process to be taught, can often be lengthy, requires the student to read and interpret material which is not appealing to the learner who wants individual teacher student communication, and is tactically orientated.

Objective III, which was to identify the types of print and non-print based instructional materials being used by junior high or high school industrial education teachers to individualize instruction, has been accepted. The types of instructional materials being used by the participating teachers were oral, print based, composite, and non-print learning materials. The interpretation of data from Tables 35 and 36 give support to the researcher claim that junior high school industrial education teachers in the province make predominant use of oral instructions augmented with printed text with their students. This group of teachers to a lesser extent make use of composite print and non-print instructional materials to present instructional content to

students working in a multiple activity environment.

Supporting Objective IV

The purpose of supporting objective IV was to determine the perception that junior high school industrial education teachers held toward the use of print and non-print instructional materials to facilitate the individualization of instruction in a multiple activity laboratory.

Data pertaining to the quality of teacher prepared instructional materials verses those that are commercially prepared yielded some interesting results. Data in Table 43 indicate participating teachers thought their self prepared instructional materials were of better quality than those instructional materials that were commercially prepared. These teachers may have held the opinion that instructional materials they prepared were more appropriate to their needs than most that were commercially prepared.

Participants were asked to rate print materials from a cost factor and their attractiveness as it related to the learning style of the student. Tables 44 and 45 provide data that are interpreted to show that participants in the research agreed that print instructional materials were predominantly used with junior high school students because these materials were versatile and low in cost even though these materials may lack student appeal or may not suit the individual learning style of the student. These data could also be interpreted to mean that these materials are

preferred by the teachers because the needs of the teacher are met first and the appealability to the student follows next in importance.

Commercially prepared graphic instructional materials were found by those involved in the study to be costly, often difficult to locate and have student appeal as learning devices. Limited school budgets available to industrial arts teachers often curtail the purchase of commercially prepared instructional materials even when appropriate materials can be found. These materials sometimes appeal to students because students find them entertaining and little effort is required on the part of the student to grasp the intended message. This interpretation finds support from data in Tables 46, 47 and 48.

Interpreting data from Tables 49, 50, 51 and 52 give support that nearly half of the industrial education teachers that participated in the research were attempting to use some form of graphic illustrations to augment the instructional material they were using with their students. Pictorial Programmed Instruction Texts, Learning Activity Packages, Articulated Instruction Development Booklets or video cassettes are forms of instructional material which contain a relatively high percent of graphic illustrations or pictures to augment the printed word. Data in these four tables were interpreted to mean that roughly a third of the respondents were not using these forms of instructional

material and were relying heavily on using instructional materials that were predominantly print based.

The interpretation of data found in Tables 43 to 52 provides information for the researcher to accept supporting objective IV. Supporting objective IV was to identify some of the opinions industrial education teachers held toward specific forms of instructional materials. These instructional materials were filmstrips, slides, films, learning activity packages, videocassettes, Pictoral Programmed Instruction Texts, Articulated Instruction Development Booklets.

The above interpretation of data indicated that the participating industrial education teachers in Alberta tend to use individualized instruction to help them manage a class of students working in a multiple activity laboratory. The purpose of this study was to determine how industrial education teachers in the province used individualized instruction as a classroom management technique in their multiple activity laboratory. The purpose of the study was achieved because the participating teachers manage this learning environment and its students by: attempting to structure the learning activities to the student's while meeting the needs of the teacher, by manipulating various management elements, and providing instruction through various modes of presentation.

Chapter V

Summary, Conclusions, Recommendations, and Observations

The content of Chapter IV interpreted the data that was obtained from the research instrument and fulfilled by the problem statement and the four supporting objectives.

The content of this chapter summarizes the research, provides conclusions that were derived from the analyzed data, makes recommendations for further research to Alberta Education, the Faculty of Education and other researchers, and lists observations that were made by the researcher while conducting the study.

Summary

Industrial education in the province of Alberta has a relatively short history when compared to other subject areas such as Mathematics, Science and English in the secondary schools of Alberta. The history of this subject area can be traced to the territorial era of the Province and the MacDonald Training Plan which began in 1900 and ended in 1903. The content of this subject area has evolved from an emphasis heavily orientated toward manufacturing to an emphasis on the basic technology found in a productive society. The environment for this subject area evolved from a single shop, where only one material was used when teaching processes and principles, to a multiple activity learning

environment where several materials are used and various technologies taught. In the latter learning environment, continued emphasis is placed on the learner to accept more responsibility for learning and the teacher becomes more of a facilitator to the learner.

The purpose of this study was to determine how junior high school industrial education teachers in the province use individualized instruction as a classroom management technique where the learning environment is organized as a multiple activity laboratory. In support of the main problem, four supporting objectives were established.

> To determine if individualized instruction complements the classroom management methods used by junior high school industrial education teachers, teaching in a multiple activity laboratory.
>
> To determine the major problems that junior high school industrial education teachers encounter in their attempt to individualize instruction in their laboratory.
>
> To identify the types of print based and non-print based instructional materials being used by junior high school industrial education teachers to individualize instruction.
>
> To determine the perception that junior high school industrial education teachers in the province hold toward the use of print and non-print instructional materials to individualize instruction.

Support for conducting this research is reflected in the concern that in the future the Department of Education will place more emphasis on students assuming increased responsibility for their learning, and thus necessitating a

change in teaching methods from the traditional group based methods to an individualized approach. This study was conducted to identify if Industrial Education teachers at the junior high school level were using a variety of instructional materials to individualize instruction and to identify the procedures that Industrial Education teachers used to help manage a multiple activity laboratory. The study has significance because results obtained might be considered by curriculum developers at the Department of Education as they look to develop curricula for Career and Technology Studies.

To collect data for this study a two part questionnaire was designed. Prior to implementation the questionnaire was pilot tested by six industrial education teachers readily available to the researcher and who were not involved in the major study. Following the pilot study the instrument was edited and revised before it was used as a data collecting instrument.

Part A of the instrument consisted of 52 statements from which participants could select the appropriate response from a five point Likert Scale. These choices were "strongly agree", "moderately agree", "undecided", "moderately disagree", and "strongly disagree".

Part B of the instrument included 8 questions to collect demographic information which was used to form a profile of those involved in the research.

Correspondence was initiated with the Associate Director of the Curriculum Design Branch, Alberta Education, to obtain the List of Operating Schools in Alberta 1990-91 and the List of Industrial Education Teachers By School Name 1990. The List of Operating Schools in Alberta 1990-91 included; the district where the school was located, the superintendent's name and address, the principal's name and address, the number of teachers employed as well as the grades taught in the schools of the district. The List of Industrial Education Teachers By School Name 1990 provided the name and address of the school and the name of the industrial education teacher who taught in the school during the 1990 school year. These two lists were cross referenced to compile a list of junior high school industrial education teachers teaching in the province in 1990. This composite listing of junior high school industrial education teachers was stratified into urban and rural schools and was used to draw the sample population at a ratio of two urban schools to one rural school.

Participants in this research study were granted anonymity and free to withdraw without prejudice as outlined in the Ethics Review documentation from the Department of Adult, Career and Technology Education. A Copy of the Ethics Review Committee approval for this study is found in Appendix C, page 220.

Ninety-four superintendents of school jurisdictions in

the province that offered industrial education at the junior high level were identified. Four of the ninety-four superintendents were contacted through the Cooperative Activities Program, Field Experiences, Faculty of Education at the University of Alberta. All these superintendents were asked to participate in the study by granting permission to the researcher to contact the junior high school industrial education teachers within their jurisdiction to participate in the investigation. Eighty-eight or 93% of the superintendents co-operated with the request, two superintendents refused and four did not respond.

From a population of 376 junior high school industrial education teachers, a random sample was drawn, guided by procedures outlined by Levin and Fox (1988), in Elementary Statistics in Social Research. From this procedure a random sample of 150 consisting of 100 urban and 50 rural, junior high school industrial education teachers was taken. Only 146 teachers actually participated in the study, four teachers were eliminated from the research because their superintendent refused to allow them to participate.

Through the principal of each participating school, the industrial education teacher of that school received a research package that included: a letter requesting his/her participation in the study, a copy of the instrument and a stamped self addressed return envelope. Of the 150 teachers who were sent a research package, 95 returned the completed

instruments by the deadline date established. This represented a 65% rate of return. To increase the rate of return a follow-up procedure was used. In essence the follow-up procedure was a duplicate of the initial request. From the follow-up an additional 9 instruments were returned. This increased the rate of return to 71%. Only 95 of the 104 returned instruments were used. Four teachers opted out of the study, two were on medical leave, one transferred to another school district, one retired and one teacher died before completing the questionnaire.

Returned questionnaires were coded and the ratings placed on spread sheets and then entered into a micro computer for data analysis. The data analysis package Statistical Package for Social Sciences (SPSS PC+) was used to provide data for the frequency tables in this study.

For ease of interpretation all data that were collected were placed into tables which indicated frequencies and percentages. From these tables the findings and conclusions of the study were generated.

Conclusions

From data in tables found in Chapter 4, agreement was shown for supporting objectives I through IV, and support was given to the main purpose of the study which was to determine how industrial education teachers in the province use individualized instruction as a classroom management technique in a multiple activity laboratory.

Data in Tables 1 through 28, show that industrial education teachers involved in the research study do in fact make an effort to individualize instruction. Similarly data in Tables 29 through 52, show that the industrial education teachers attempt to individualize instruction by using instructional materials that are mainly print based followed by non-print instructional materials. Teachers involved in the research indicated that these instructional materials were self-produced because of the high cost and low quality of commercially produced instructional materials.

Teachers in the study in their attempt to provide individualized instruction controlled content, space and time and by the way they work with students through the control of equipment and supplies.

Findings of the research study that were related to objectives I and II provided the foundation for making the following conclusions.

1. Industrial education teachers manipulate the space allotted to each area of study within their laboratory.
2. The allotment of time permitted for students to complete assignments is controlled by the industrial education teacher.
3. The management of students/personnel in their progression throughout the various areas of study is the responsibility of the teacher.
4. Teachers select and control the instructional material

and content of the course.

5. Industrial education teachers manage the equipment and materials that the students use as they work in the laboratory.

These five conclusions give support to the individualization of instruction as a management technique used by junior high school industrial education teachers in a multiple activity learning environment, thus supporting objective I of the research. Support for the second supporting objective can also be found in these five conclusions as teachers attempt to solve the major problems manipulating space, time, student/personnel movement, content presentation, and equipment/materials, particularly when they attempt to individualize instruction in their laboratories.

Data analysed from the research instrument support findings that relate to objective III and lead the researcher to formulate these conclusions:

1. Industrial education teachers in the province made little use of non-print instructional materials as the main method of providing instruction to students working in the laboratory.
2. Composite print/non-print instructional materials were used by approximately half of the junior high school industrial education teachers in the province to present instruction to students as they work in the laboratory.
3. Verbal instruction as a method of presenting content and

direction to the learner was preferred by the majority of participating teachers.

4. Print instructional materials, presented as typed or printed text were one of the main groups of instructional materials that were used by industrial education teachers to teach students to work individually in the laboratory.
5. The range of teacher preference for the type of instructional material that was best suited for a variety of teaching formats when placed on a continuum varied from non-print instructional materials with little preference, through print and composite instructional materials which were near equal in preference, to verbal instructions which held a strong preference.

These five conclusions on the type of instructional materials used by junior high industrial education teachers meets the requirements for objective III. Participating teachers indicated they used verbal, print, composite print/picture, and non-print instructional materials in that order to instruct students as they work individually in the laboratory.

Research findings related to objective IV support the researcher in making these conclusions.

1. Industrial education teachers indicated that teacher prepared instructional materials were of better quality

than commercially prepared instructional materials.

2. Print instructional materials were more economical and versatile in meeting both teacher, and some student needs even though these instructional materials were considered to be low in student appeal and may not be suited for the individual learning style of the learner.
3. Commercially prepared instructional materials, that were suited to meeting the needs of the teacher, the student and program content, were considered by participants to be expensive and difficult to locate.
4. Most industrial education teachers involved in the study used specific forms of print and non-print instructional materials. Some of the materials that these teachers used included Pictorial Programmed Instruction Texts, Learning Activity Packages, an Articulated Instructional Development Booklets, and videocassettes.

These last four conclusions were derived from data in Tables 43 to 52, and summarize the preferred instructional materials that were predominantly teacher designed or provincially designed print and/or composite instructional materials. Findings of the research indicate that these instructional materials were augmented with oral explanations by participants.

The average industrial education teacher who provided data to the study had between 14 and 20 years teaching experience which indicated a stable mature group of teachers.

The average participant received their preservice training at the University of Alberta where they completed psychomotor skill development courses that were taught in a multiple activity laboratory. During their teaching preparation these teachers were exposed to the procedures that were used to manage a multiple activity laboratory. Since completing their teacher preparation program these teachers had both physically and psychosocially dysfunctional students integrated into their student laboratory population. The average teacher spent 80% of their teaching time in industrial education and the remaining 20% teaching in other subject areas.

Recommendations

The following recommendations are made based on the results of this study and apply to each of the groups addressed:

University of Alberta Teacher Preparation Personnel

It is recommended that personnel, in the Department of Secondary Education responsible for preparing industrial education teachers design a methods course where preservice and inservice teachers are provided with the opportunity to learn how to manage a multiple activity laboratory. This recommendation is made because 43% of participants indicated they had no preparation on how to manage a multiple activity laboratory. Nearly 57% of the teachers indicated they did

receive laboratory management training, however a question remains, did they actually manage (set up and develop a laboratory) or only student taught and observed in a previously established laboratory?

It is recommended that a course or portion of a course be devoted solely to the preparation of print and non-print instructional material. This course could be team taught by a specialist in educational media and a specialist in the materials and technologies being taught.

It is recommended to department personnel that inservice workshops be conducted throughout the province that would be devoted to the procedures used to design and develop instructional materials and how these instructional materials can be integrated into modules to be used to individualize instruction.

Research into problems that teachers encounter while teaching the Alberta Multiple Activity Program should be conducted on a continuing basis to help identify problem areas and make the transition to the new Career and Technology Studies Program smoother.

ALberta Department of Education

The following recommendations are made to the personnel of the Curriculum Branch of Alberta Education.

It is recommended that a prototype module for structuring instructional content for industrial education be designed and distributed to involved teachers as soon as

possible for their input and integration.

It is recommended that financial support be made available to industrial education teachers who wish to attend workshops that concentrate on the design and development of instructional materials to individualize instruction.

It is recommended that the Curriculum Branch provide leadership to the teachers in the processes used to develop learner profiles that can be used by the teacher as a management technique to individualize instruction.

Other Researchers

Outcomes derived from conducting this research study recommend further qualitative or quantitative research be undertaken to determine if and how industrial education teachers actually incorporate individualized instruction in their laboratories.

It is recommended to other researchers that a similar study be conducted in the larger population centers of the province, where on-site visits could be made by the researcher to schools to verify the type of instructional materials that are used and the instructional procedures that are used to implement these materials.

A similar study could be conducted with senior high school industrial education students to determine if the teachers are individualizing instruction, the instructional materials used and how these teachers manage a multiple activity laboratory.

The researcher recommends that the existing instrument be edited and condensed before it is used in another study. The existing instrument contains statements that are similar which can be confusing.

Industrial Education Teachers

The provincial scope of this study revealed a wide range of teacher response, from enthusiasm to apathy in teaching and managing an industrial education multiple activity program.

It is recommended that industrial education teachers enrol in any upgrading credit/non-credit courses made available throughout Alberta to increase their expertise and to become more aware of the technological advancements impacting upon them and their students.

It is recommended to junior high school industrial education teachers that they begin to experiment with additional instructional media and technologies to break the traditional teaching method mold of "let me show you", in which they now find themselves. These teachers must negate the stereotype methods of teaching that some are presently using and make the transition from a teacher dominated learning environment to one that is more learner orientated.

It is recommended that a more cooperative attitude be developed among inservice industrial education teachers to share instructional materials they develop and to facilitate the dissemination of these materials so replication does not

take place.

Industrial Education Specialist Council

Many industrial education teachers feel isolated and without support in the predominantly academic environment in their schools and school jurisdictions because of the nature of the subject and lack of personnel or opportunity for communication in the technology field.

It is recommended that the Industrial Education Specialist Council of the Alberta Teachers' Association, (INDEC), work collaboratively with the inservice teachers and university personnel to organize and present a series of inservice courses that would update and upgrade provincial teachers in the latest materials and technologies.

It is recommended that INDEC take the initiative to encourage industrial education teachers to design other instructional materials other than Articulated Instructional Development Booklets. The materials that are designed should be predominantly non-print.

Observations

Several observations were made by the researcher as a result of having conducted this research.

The excellent rate of return on the questionnaire was mainly due to the co-operation of the participating industrial eduction teachers selected for this study.

Some of the superintendents and participating teachers

expressed interest in the results of the study.

Co-operation received from personnel of the Department of Education was appreciated because these individuals provided the researcher with the needed lists that were requested that made possible the identification of the sample teachers.

The research instrument was considered to be lengthy consequently it should be further edited and refined to make it more efficient and easier to use.

The task of learning and conducting the operation of the SPSS PC+ data analysis package was not anticipated by the researcher, as part of the thesis writing process, but added a feeling of control and comprehension of what the computer did in the analysis of the data.

Maintaining a realistic time frame, for instrument mailing and turn around time, was difficult with the addition of an unanticipated mail stike that took place early in the research.

Weakness of the Study

During the oral defense of this study the examining committee pointed out a weakness in the wording of the statements on the instrument. Several qualifiers such as "primary" and "predominantly" tend to lead the participant in his responses and made it difficult to interpret the collective data.

Several statements could have been shortened by eleminating extraneous phrases. In addition some statements could have been phrased in a more positive way.

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APPENDIX A

This appendix contains a copy of the questionnaire that was used in this study.

ID #

Individualized Instruction, Its Role in Management of Industrial Education Classrooms

To the participant:

Instruction Sheet

As an industrial education teacher you are probably aware of the problems associated with teaching students in a multiple activity learning environment. Today the administrative trend is to mainstream handicapped as well as gifted students into regular classrooms including industrial education laboratories. This presents the teacher with a myriad of problems.

Purpose of the Study

The purpose of this study is to determine how industrial education teachers in the province use individualized instruction, as a classroom management technique, when used in a learning environment organized as a multiple activity laboratory.

Your Role in the Study

As a participant in the study you are asked to cooperate by completing the attached questionnaire which consists of two parts. Part A presents a series of statements that ask for your opinion of the role that individualized instruction has as an aid to assist the teacher to manage a multiple activity laboratory. Part B deals with the demographic information of those involved in the research.

Part A: To complete this portion of the questionnaire, read each statement and then circle the number which best reflects your opinion toward that statement. The numbers have the following meaning.

1. strongly agree (SA)
2. moderately agree (MA)
3. Undecided (U)
4. moderately disagree (MD)
5. strongly disagree (SD)

On the following page is a list of definitions that are study specific. Please carefully read the following definitions and apply their meanings to the statements on the instrument.

Definitions applicable to this research

CLASSROOM MANAGEMENT

Classroom management is the process of a teacher planning curriculum, organizing procedures and resources, arranging the environment to maximize learning efficiency, monitoring student progress, and anticipating potential problems.

INDIVIDUALIZED INSTRUCTION

Individualized instruction involves teacher and student input in tailoring a regular program of studies by altering the program objectives, varying the time component, and providing various means of presenting course content, to suit the student's learning requirements and characteristics as a learner, enabling the student to achieve the established goals.

MULTIPLE ACTIVITY LABORATORY

A multiple activity laboratory is the setting used to teach the Alberta Industrial Education Program in which three or more activities are taught concurrently in a number of different areas representing components of various fields of study.

HANDICAPPED STUDENTS

Handicapped students have been diagnosed as mentally, physically, or emotionally/behaviorally disordered and placed in special education classes to meet their specialized needs.

GROUP ROTATION APPROACH

The management technique of dividing a class of students into four subgroups and rotating these subgroups as a unit into the different areas of the multiple activity laboratory after each group has spent a fixed time in each area.

ARTICULATED INSTRUCTION DEVELOPMENT BOOKLET (AID)

Articulated instruction developement booklets are soft bound with a half page format, graphic and print based showing and telling the students the procedures to follow when constructing a project. These booklets are project specific.

LEARNING ACTIVITY PACKAGE (LAP)

A learning activity package is predominantly a written form of communication between the student and teacher that contains instructions for student activities leading toward a specified performance outcome.

PICTORAL PROGRAMMED INSTRUCTION (PPI)

A pictoral programmed instruction manual consists of a series of precise descriptive statements with supporting photographs arranged in sequential programmed order to describe a process or operation a student is to perform.

ID #

Part A Section 1

The purpose of this study is to determine how industrial education teachers in the province use individualized instruction as a classroom management technique when used in a learning environment organized as a multiple activity laboratory.

State your opinion of these statements on classroom management techniques by selecting one of the following responses.

1. strongly agree (SA)
2. moderately agree (MA)
3. undecided (U)
4. moderately disagree (MD)
5. strongly disagree (SD)

1. Efficient laboratory space usage is best accomplished by the teacher assigning students to simultaneously work at all stations throughout the laboratory.	1	2	3	4	5
2. Space allocated to a field of study in an industrial education laboratory is set by the teacher.	1	2	3	4	5
3. Time allocated for students to complete activities should vary because of different student learning styles.	1	2	3	4	5
4. Individualized instruction permits the teacher to devote more time to those students who need additional individual assistance.	1	2	3	4	5
5. Simultaneous student progression by groups from area to area can place increased stress on the teacher at rotation time.	1	2	3	4	5
6. Student rotation through modules as individuals may be easier to accomplish when individualized instruction is used than when the group rotation and instruction is used.	1	2	3	4	5

State your opinion of these statements on classroom management techniques by selecting one of the following responses.

1) strongly agree (SA)
2) moderately agree (MA)
3) undecided (U)
4) moderately disagree (MD)
5) strongly disagree (SD)

7. Equipment and material management problems become intensified when groups of students are pressured to complete a set of activities within a fixed period of time.	1	2	3	4	5
8. Teachers can effectively control program and equipment repair costs by individualizing instruction and dispersing students into all areas of the laboratory to reduce student congestion.	1	2	3	4	5
9. The increased use of individualized instruction may be a major asset to the teacher for controlling the numerous simultaneous student learning activities that are determined by course content found in the curriculum guide.	1	2	3	4	5
10. Students are individuals with varying learning needs and capabilities that are best met by a teacher providing a range of course requirements for students to achieve.	1	2	3	4	5
11. Some industrial education teachers emulate the teaching system by which they were prepared and prefer to use group rotation to operate and design their laboratories.	1	2	3	4	5
12. Teacher resistance to experiment with a different method of organizing and teaching industrial education in a multiple activity laboratory stifles the use and expansion of individualized instruction in this subject.	1	2	3	4	5
13. The modular design for teaching multiple activity industrial education is conducive to using individualized instruction to teach in and manage a multiple activity laboratory.	1	2	3	4	5

State your opinion of these statements on classroom management techniques by selecting one of the following responses.

1) strongly agree (SA)
2) moderately agree (MA)
3) undecided (U)
4) moderately disagree (MD)
5) strongly disagree (SD)

14. The position of some teachers is that the mechanics involved in preparing and using individualized instruction materials are so time consuming that these materials are not worth it.	1	2	3	4	5
15. Would you make greater use of individualized instructional material if you were given release time to develop these materials?	1	2	3	4	5
16. The task of teaching students through a different instructional method (individualized instruction) to what they were accustomed to, (group instruction), may hinder the teacher adopting individualized instruction as a teaching method.	1	2	3	4	5
17. In your laboratory, would you make greater use of individualized instructional materials if you had someone available to assist you in preparing these materials?	1	2	3	4	5
18. Tracking student progress and recording it when using individualized instruction can be accomplished by the teacher using well organized charts as a system to record the progress of the individual student.	1	2	3	4	5
19. Junior high students have the ability to read and comprehend simplified written instructions that are part of instructional material to individualize instruction.	1	2	3	4	5
20. Teachers should attempt to provide students with precise individual directions so the student can perform learning activities at their own pace.	1	2	3	4	5

State your opinion of these statements on classroom management techniques by selecting one of the following responses.

1) strongly agree (SA)
2) moderately agree (MA)
3) undecided (U)
4) moderately disagree (MD)
5. strongly disagree (SD)

21. A students' desire to socialize and work as a member of a group can be accommodated through a system to individualize instruction in industrial education.	1	2	3	4	5
22. Your preference to use conventional group instruction in your laboratory takes precedence over the individualized instruction method.	1	2	3	4	5
23. Wastage of material may be reduced when industrial education is taught using the individualized instruction method.	1	2	3	4	5
24. Equipment breakdowns in the multiple activity laboratory are easier to manage when only one student is dependent upon a machine rather than when a group of students are dependent on that machine.	1	2	3	4	5
25. Individualized instructional materials may not meet your needs as an industrial education teacher.	1	2	3	4	5
26. You may not have the necessary background to write individualized instructional materials.	1	2	3	4	5
27. Commercially prepared instructional material for industrial education may not fit the needs of your program to be of beneficial use.	1	2	3	4	5
28. The cost of purchasing commercially prepared instructional materials may not be within your budget.	1	2	3	4	5

Part A Section 2

Rate your current classroom management technique by selecting one of the following responses.

29. Articulated Instruction Booklets (AID) booklets are the primary instructional material that you use to individualize instruction in your laboratory. 1 2 3 4 5

30. Computer assisted instruction programs and techniques are being used by you in a portion of your program as a means of individualizing instruction to manage students. 1 2 3 4 5

31. Film loops (35 mm), with or without sound, are used as instructional material to individualize instruction to provide course content to students who are learning to work with a tool, material or process in your laboratory. 1 2 3 4 5

32. Transparencies are used in your laboratory as instructional material to instruct students who are working on learning activities. 1 2 3 4 5

33. Learning activity packages (LAP) are used as instructional material to individualize instruction and to instruct students working in the laboratory. 1 2 3 4 5

34. Pictoral Programmed Instructional Texts (PPI's) are used by you as instructional material to assist with instructing students as they work in the multiple activity laboratory where you teach. 1 2 3 4 5

35. Written instructional sheets, operation or job sheets, which consist of sequential step by step written instructions, are predominantly used to provide instruction in your laboratory. 1 2 3 4 5

36. Verbal instruction given to students by you is the main method of delivery used by you to provide directions or instructions to students as they work in the laboratory. 1 2 3 4 5

Rate your current classroom management techniques by selecting one of the following responses.

1. strongly agree (SA)
2. moderately agree (MA)
3. undecided (U)
4. moderately disagree (MD)
5. strongly disagree (SD)

37. Graphic flip charts are used by you to assist in the instruction of students in your laboratory.	1	2	3	4	5
38. Computer programs are being used by you to assist with the instruction of students as they work in your laboratory.	1	2	3	4	5
39. Slides are used as instructional material to present learning activities to the students in your laboratory.	1	2	3	4	5
40. Audio tapes are used to provide instruction to students as they work independently in your laboratory.	1	2	3	4	5
41. Video tapes are used by you to provide instructional material to students while they individualy work in your laboratory.	1	2	3	4	5
42. Combinations of instructional materials are being used by you because they work best in your laboratory to help meet the individual learning needs of the student.	1	2	3	4	5
43. The quality of teacher prepared instructional materials is inferior to those instructional materials that are commercially prepared.	1	2	3	4	5
44. Print instructional materials are predominantly used because they are versatile and are low in cost.	1	2	3	4	5
45. Print instructional materials when presented alone do not appeal to the individual learning styles of the student.	1	2	3	4	5
46. Non print materials (i.e., filmstrips, slides, and 16 mm films) appeal to students as learning devices because of the graphics used to present the intended concept.	1	2	3	4	5

Rate your current classroom management techniques by selecting one of the following responses.

1. strongly agree (SA)
2. moderately agree (MA)
3. undecided (U)
4. moderately disagree (MD)
5. strongly disagree (SD)

47. Commercially prepared, content specific, non print instructional materials such as slides, filmstrips, and films are often difficult to locate.	1	2	3	4	5
48. Purchasing commercially prepared non-print materials are often beyond the budget limitations granted to you by the administration.	1	2	3	4	5
49. Teacher prepared Pictoral Programmed Instruction Texts are content specific and facilitate your needs in individualizing instruction in your laboratory.	1	2	3	4	5
50. If learning activity packages (LAP), are used in your laboratory, these LAPs contain pictures as well as script.	1	2	3	4	5
51. Video cassettes are used by you to provide instructional material to students while they are working in your laboratory.	1	2	3	4	5
52. AID booklets are used by you to provide instructional material to students while they are working in your laboratory.	1	2	3	4	5

Part B

Background Information:

Your answers to the following statements will help to develop a profile for those who participate in the research. Please circle the letter or number of the best answer.

1. Your industrial education teaching assignment is:

   a) at the grade 7,8,9 level.
   b) Industrial Education 10, 20, 30.
   c) split between the grade 7,8,9 level and Industrial Education 10, 20, 30.

2. What percentage of your total teaching duties is devoted to teaching industrial education?

   a) 80% to 100%
   b) 60% to 79%
   c) 40% to 59%
   d) less than 39%

3. Please indicate the number of years you have taught industrial arts (industrial education) in the schools of the province.

   1 2 3 4 5 6 7 8 9 10 12 14 16 18 20 or more

4. Identify the teacher education program which prepared you to teach industrial education.

   a) industrial arts (industrial education)
   b) vocational education
   c) other _____

5. Please identify the institution responsible for your teacher preparation:

   a) University of Alberta
   b) Other Canadian Institutions
   c) Non-Canadian Institutions

6. Did you have any formal preparation that would permit you to manage a multiple activity learning environment, like that used in teaching the Alberta Industrial Education Program?

   a) yes
   b) no

   If "yes" where did you receive that preparation? _____
_____

7. Have handicapped students been integrated into your classes?

   a) yes b) no

   If "yes" please identify the handicap.

   physically dysfunctional _____

   psychosocially dysfunctional _____

8. Comments: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

APPENDIX B

This appendix contains a copy of the correspondence that was sent to the superintendents, principals and industrial education teachers involved in the study.

University of Alberta
Edmonton
Canada T6G 2G5

Adult, Career and Technology Education
Faculty of Education
633 Education South, Telephone (403) 492-3678
Fax (403) 492-0236

Initial letter to Superintendents

September 3, 1991

^F1^
Superintendent of Schools
^F2^
^F3^
^F4^

Dear ^F5^ :

Presently I am teaching Industrial Education to grade 8 and 9 students at St. Vincent de Paul Junior High School in Calgary; in addition to being enrolled as a graduate student in the Faculty of Graduate Studies and Research at the University of Alberta.

To fulfill the requirements for a Master of Education degree, I have elected to complete a thesis, entitled "Individualized Instruction: Its Role in Classroom Management of an Industrial Education Laboratory".

I would like to request your cooperation in the study by granting me permission to survey a sample of the industrial education teachers (non-vocational) employed in your jurisdiction by having them complete a questionnaire.

The questionnaire is a two part instrument: 1) asks the teacher's opinion on the use of individualized instruction to assist in the management of an industrial education classroom, 2) seeks demographic information from the teacher. For your information a copy of the questionnaire is enclosed.

I would appreciate if you would return the enclosed consent form by September 15 so that I may continue to meet the timetable established for various phases of the study.

Thank you for your cooperation.

Sincerely,

C. H. Preitz Ed. D.
supervisor

Allen Dow
masters candidate

University of Alberta
Edmonton
Canada T6G 2G5

Adult, Career and Technology Education
Faculty of Education
633 Education South, Telephone (403) 492-3678
Fax (403) 492-0236

Follow-up letter to Superintendents

September 21, 1991

^F1^
Superintendent of Schools
^F2^
^F3^
^F4^

Dear ^F1^:

It is possible that because of your busy schedule you may have overlooked my letter of September 3, 1991 In that letter I requested your permission to conduct research with the industrial education teachers of your school district.

To date I have not received your response. It is important to the study that these teachers be involved in the research because of the settings in which they teach.

It would be appreciated if I could have your approval by Oct. 15, so I might proceed with the study and meet established deadlines.

Thank you for your cooperation.

Sincerely yours,

Allen Dow

Superintendent Consent Form

Please fill in this form and return it to me in the enclosed envelope.

Date :_____

School Jurisdiction:_____

Permission granted: _____ **Permission not granted** _____

Superintendent Signature: _____

University of Alberta
Edmonton
Canada T6G 2G5

Adult, Career and Technology Education
Faculty of Education
633 Education South, Telephone (403) 492-3678
Fax (403) 492-0236

Letter to Principals

September 30, 1991

^F2^
Principal
^F4^
^F5^
^F6^

Dear ^F7^:

I am presently teaching Industrial Education grades 8 and 9 at St. Vincent De Paul Junior High School in Calgary. In addition, I am also registered as a graduate student at the university of Alberta.

In order to fulfill the requirements for a Masters of Education degree, I have elected to complete a thesis. The topic is, "Individualized Instruction: Its Role in the Classroom Management of an Industrial Education Laboratory".

I have received permission from the Superintendent of Schools (or his designate) of your school district, to conduct this research with an industrial education teacher (non-vocational) presently teaching in your school. Enclosed is a letter requesting the teacher's assistance and a questionnaire for that teacher to fill out.

The questionnaire is a two part instrument. Part A asks for the teacher's opinion on the role of individualized instruction as an aid in assisting the teacher to manage an industrial education multiple activity learning environment. Part B of the questionnaire asks demographic information of the teacher.

Please forward the enclosed questionnaire to the designated teacher.

Thank you for your cooperation.

Sincerely yours.

Allen Dow

University of Alberta
Edmonton
Canada T6G 2G5

Adult, Career and Technology Education
Faculty of Education
633 Education South, Telephone (403) 492-3678
Fax (403) 492-0236

Initial Letter to Teachers

September 30, 1991

^F3^
Industrial Education Teacher
^F4^
^F5^
^F6^

Dear ^F8^:

I am presently teaching Industrial Education grades 8 and 9 at St. Vincent de Paul Junior High School in Calgary. In addition I am also registered as a graduate student at the University of Alberta.

To fulfill the requirements for a Masters of Education degree, I have elected to complete a thesis. The topic is, "Individualized Instruction: Its Role in the Classroom Management of an Industrial Education Laboratory".

You have been selected, by a random sample of rural and urban non-vocational industrial education teachers in the province of Alberta, to participate. The purpose of this letter is to request your participation in the study by completing the enclosed questionnaire.

Please complete the attached questionnaire and return it in the self addressed stamped envelope by October 15 th. Each questionnaire is coded for the researcher only, your responses will be kept anonymous and confidential and you may withdraw from the study at any time without prejudice. Following analysis of the data all questionnaires will be destroyed.

A copy of an abstract of the study will be made available upon request.

Thank you for your cooperation.

Sincerely,

Allen J. Dow

University of Alberta
Edmonton
Canada T6G 2G5

Adult, Career and Technology Education
Faculty of Education
633 Education South, Telephone (403) 492-3678
Fax (403) 492-0236

Follow up Letter to Teachers

October 15, 1991

^F3^
Industrial Education Teacher
^F4^
^F5^
^F6^

Dear ^F8^:

I am presently teaching Industrial Education grades 8 and 9 at St. Vincent de Paul Junior High School in Calgary. In addition I am also registered as a graduate student at the University of Alberta.

To fulfill the requirements for a Masters of Education degree, I have elected to complete a thesis. The topic is, "Individualized Instruction: Its Role in the Classroom Management of an Industrial Education Laboratory".

You have been selected, by a random sample of rural and urban non-vocational industrial education teachers in the province of Alberta, to participate. The purpose of this letter is to request your participation in the study by completing the enclosed questionnaire.

Please complete the attached questionnaire and return it in the self addressed stamped envelope by October 30th. Each questionnaire is coded for the researcher only, your responses will be kept anonymous and confidential and you may withdraw from the study at any time without prejudice. Following analysis of the data all questionnaires will be destroyed.

A copy of an abstract of the study will be made available upon request.

Thank you for your cooperation.

Sincerely,

Allen J. Dow

APPENDIX C

In this appendix is the Research Ethics Review Consent Form for this study as well as the vitae of the researcher.

Adult, Career & Technology Education

RESEARCH ETHICS REVIEW APPLICATION

(Please submit a typed copy of this form and a copy of the research proposal to the Department Chairman's office.)

Student Name Allen J. Dow

Short title of proposed research Individualized Instruction in Industrial Education classroom management

x M.Ed. thesis __ M.Ed. project

Location of research Calgary Date approval needed 09/15/91

The applicant agrees to notify the Department Ethics Review Committee of any changes in research design after approval has been granted.

Allen J. Dow (Signature of applicant) 08/21/91 (date) 19 91

The research proposal has been approved by the Supervisory Committee.

Clarence A Pratt (Signature of Supervisor) 08-23 (date) 1991

For Office use only

Date submitted _____ Date decision conveyed _____

Members of Review Committee D. COLLETT, A. DEADE

Decision of Committee Approved (Approved or not Approved) Aug 29 (Date) 19 91

Comments Please attend to items 5 and 8 before data collection.

(Signature, Department Chairman)

Student Name Allen J. Dow

Short Title Individualized Instruction in Industrial Education classroom management

Summary of proposed research (Please confine to space provided on this page)

The purpose of this study is to determine how industrial education teachers in the province use individualized instruction as a classroom management technique when used in a learning environment organized as a multiple activity laboratory.

The plan is to survey the teachers of industrial education in Alberta to determine if individualized instruction compliments the classroom management methods used, to determine the problems that teachers encounter in their attempt to individualize instruction, and to identify the types of print based and non-print based instructional materials being used to individualize instruction.

Ethical concerns and safeguards (See General Faculties Council Guidelines)

Participants in the study have the right to withdraw from the research without prejudice.

CURRICULUM VITAE

Allen John Dow

Biographical Information:

Birthdate: February 12, 1943 - Lethbridge, Alberta

Married - Margaret Ellen Dow

Two daughters.

Professional Education:

Baccalaureate Degree: Bachelor of Science Degree in Industrial Arts - Montana State University - 1968 - Bozeman, Montana

Associations and Professional Memberships:

Member: - Alberta Teachers'Association

- Industrial Education Council of the Alberta Teachers'Association

- International Technology Education Association

Awards:

Recipient of the Teacher Plus Award Calgary Separate School Board - 1986

Professional Career Experience:

Calgary Separate School Board 1969 - present.

Present Employment:

Industrial Education Teacher - St. Vincent de Paul Junior High School
Calgary, Alberta